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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Training Farm for Boys.

The Minister of Agriculture (Hon. J. P. Wilson, M.L.C.) has practically completed arrangements for the establishment of a training farm for boys. It is not proposed to establish a rival establishment to Roseworthy College, but to provide means for elementary education in agriculture for boys whose parents cannot afford to send them to Roseworthy College. The object of the Minister is to encourage boys who sell newspapers and do odd jobs about the city streets to take up farm work in the belief that the healthy environment of a country life will build them up physically, mentally, and morally. It is believed that 12 months' training on the proposed farm will give a boy sufficient experience to make him acceptable to farmers who need assistance on their farms. Board and lodging, clothing, and boots, as may be decided upon, will be supplied in return for the labor of the boy. A scheme of bonuses or premiums will be instituted for the purpose of encouraging boys to do well and providing them with funds when they leave the institution.

Experimental Poultry Farming.

It is probable that an experimental poultry farm will be established at Murray Bridge during this month. The Minister of Agriculture (Hon. J. P. Wilson, M.L.C.), accompanied by the Poultry Expert (Mr. D. F. Laurie), has visited the locality with the object of selecting a suitable site for a farm. The object of the farm would be to breed stock for commercial purposes, and to educate the people of the district in the direction of producing better poultry and a standard egg. The work of the farm will be carried out by a local manager under the direction of the Poultry Expert.

Wheat-stacking Blocks at Railway Stations.

In connection with the suggestions made by several of our Agricultural Bureau Branches, that farmers should co-operate to dispose of their wheat in large parcels, it may be of interest to note that where land is available inside railway station yards licences are granted by the Railways Commissioner at a charge of £1 per annum for each 25ft. frontage for stacking blocks. Where it is desired to erect sheds the charge is £5 per annum for a 50ft. frontage. In each case application should be made to the local stationmaster.

Inspector Under Foul Brood in Bees Act.

The Minister of Agriculture (Hon. J. P. Wilson, M.L.C.) has approved of the appointment of Mr. T. E. Whitelaw as inspector under the Foul Brood in Bees Act. Mr. Whitelaw possesses the full diplomas of the British Beekeepers' Association, and has had considerable experience as manager of large apiaries in Great Britain. He was for four and a half years expert organiser of a scheme formulated by Mr. E. Gareke, of Dilton House, Maidenhead, Berkshire, for the promotion of profitable beekeeping. His duties not only include lecturing and demonstrations, but also the management of a number of apiaries. Having served his time as an apprentice to a large manufacturer of bee appliances, he has a thorough practical knowledge of this section of the work. For some time Mr. Whitelaw was engaged in the Produce Department in the examination of honey for export, and he has also had local experience under one of our leading beekeepers. The Minister of Agriculture hopes later on to be able to make arrangements so that Mr. Whitelaw's services shall be availed for the lectures and demonstrations in some of the chief beekeeping centres. Recent articles in the *Journal* by "Nemo" were written by Mr. Whitelaw, and queries concerning beekeeping addressed to the editor will be answered by him.

Storing Apples.

The Horticultural Instructor writes: "Mr. F. A. Joyner, solicitor, of Adelaide, who is an enthusiastic horticulturalist in his spare time, has forwarded to me a photograph illustrating his method of storing apples in boxes in an underground room at his house at Bridgewater. Mr. Joyner says that he simply took advantage of the space under his dwelling-house, which is built on fairly high piles, and fitted this up with shelves, into which flat boxes are lodged after the manner of crude drawers, each box holding a little more than a bushel, with the apples two or three deep. The battens forming the bottoms of the boxes are slightly spaced apart, and this permits the circulation of air, and also effects an economy in material. This gentleman remarks that after five years' experience he is quite satisfied that this method is superior to piling the apples in heaps. This year he stored about 200 bush, in heaps on the floor, and the waste from these was at least four times greater than from those stored in the trays. The fruit is gathered into lined baskets, and graded directly into the trays. He further states that the advantage which his method possesses is that the fruit can be quickly and frequently examined without actually disturbing it. It may be mentioned, however, that Mr. Evans, the manager of Mr. Barr Smith's orangery at Torrens Park, has adopted this plan for a good number of years past for the preservation of navel oranges, and he appears to be well satisfied with it. No doubt there is considerable expense at the outset in the making of the shelves and of the boxes,

but if the difference in the preserving of the fruit is taken into consideration, the extra cost should be well repaid in the long run. It should be taken note of, however, that this method of spacing the fruit to admit a circulation of air can only be carried out with safety where the admission of air from outside the building is under complete control, otherwise the apples, although favored during the winter season, shrivel badly as soon as the air becomes drier."

Irrigation and Reclamation Department.

In view of the development of irrigation and reclamation, especially along the valley of the Murray, the Government have appointed Mr. S. McIntosh as officer in charge. In addition to general work in connection with his department he will have the direction of the Murray Bridge and Pekina Creek Irrigation Farms under the Minister of Agriculture. At Pekina Creek it is intended to carry out extensive experiments in the cultivation of different varieties of lucerne, improvement of strains by selection, and also the production of pure seed of Arabian lucerne. In addition, experiments will be made in the growing of Kaffir corn and other seed-producing varieties of sorghum for poultry food, and perennial grasses, herbs, and shrubs for fodder. Mr. McIntosh is a recognised authority on lucerne cultivation and irrigation, and has contributed a number of articles to the *Journal* on these subjects.

Importation of Potatoes.

The Horticultural Instructor (Mr. G. Quinn) writes "During the past months a number of consignments of seed potatoes were brought from Victoria to Port MacDonnell by sea for distribution throughout the South-East, and some of them were actually distributed to the farms where they were to be planted. Owing, however, to the fact that potatoes, as well as other plants, are not admitted into the State other than at Serviceton, Adelaide, and Port Adelaide the importers of these tubers were compelled to collect and reship them back to their Victorian port of origin. It was claimed that as potatoes had been imported in such a way before, these should be admitted, but the law relating to the introduction of plants has been in force for several years, and it has been framed and carried out with the view of protecting the gardeners and farmers of the State. It is hoped that these producers, although they may be put to some inconvenience in getting plants and seeds, will loyally support the efforts of the Government and the department in the attempt to control the introduction of this class of produce."

Keep Good Cows.

The following extracts from an American paper illustrate the methods adopted in that part of the world to bring under the notice of cowowners the folly and waste involved in keeping inferior cows —“ The University Experiment Station, Illinois, reports that the Jersey cow, Jacoba Irene, belonging to Mr. A. O. Auten, produced in one year 17,253lbs. of milk (nearly 9 tons), equal to 1,112lbs. of butter. This is over four times the production of the average cow in Illinois. There are 250,000 cows in Illinois so inferior that it would take 200 of them to yield as much *profit* as Jacoba Irene. How much easier to milk one such cow than 200 poor ones —the first would be play, the latter drudgery. During the year this cow supplied milk worth \$653.50, and if one had 10 such cows his gross income would be \$6,535 per annum.”

California Dried Fruits.

The revised estimates of dried fruit output of California for 1909 indicate the immensity of the fruit industry in that State. Australian production is only a small fraction of that of California, but had we a population of nearly 90,000,000 as a market instead of a little over 4,000,000 we possess the soil and climate quite capable of producing all the requirements in this respect. The Californian output of dried apples last year amounted to 3,000 tons (of 2,000lbs.); apricots, 14,000 tons, figs, 4,000 tons, peaches, 20,000 tons, prunes, 75,000 tons, raisins, 70,000 tons; other dried fruits, 2,500 tons.

Experimental Potato Culture.

The Horticultural Instructor (Mr. G. Quinn) writes—“ Last year several persons forwarded to the department some exceptionally large potatoes. These were cut into sets and planted. The produce from those potatoes was sorted out into large, medium, and small tubers, each of which was weighed separately. The large tubers were cut up into several sets, which were weighed individually, and the whole of the produce from each original potato was planted in a separate plot, the individual sets, whether cut or uncut, being labelled and recorded. The object of this test, which is being carried out at the Coromandel Valley Experimental Orchard is to ascertain whether any light can be thrown in the direction of there being any tendency for large tubers to reproduce a larger average tuber than is the case with the small tubers. No originality is claimed for this, but we are desirous of seeing what will be the result under our local conditions. We intend, also, to continue the work for several seasons. All of the potatoes have been treated alike as far as soil, manure, and general tillage are concerned.”

Mallee Shoots.

The question of the quickest and most effective way to destroy the shoots on mallee stumps is one of considerable importance to the occupiers of our mallee country. In reply to an inquiry from Utera Plains Agricultural Bureau in the June issue of the *Journal* Mr. Jas. Sears, formerly a member of the Forster Agricultural Bureau, advises that as a result of a number of careful experiments and many years experience, he found that on the sandy land in that district the shoots were killed out quickest when cut in February. The best time for shoot-cutting was therefore between the middle of January and the middle of March. Mr. Sears stated that farmers had told him they were too busy in February, but in his opinion it would pay them to "make time" for this work then, as it was equally as important that it should be done at the right time as any other section of farm work.

The Origin of a Famous Wheat.

The Fife wheats of Canada are world famous, as the leading type of the "No. 1 Hard" class. The following interesting account of their origin was published in the *Canadian Agriculturist* in 1861 — "In the spring of 1812 a Glasgow friend sent to Mr. David Fife, an Ontario farmer, a quantity of wheat from a cargo obtained direct from Dantzic (Russia). This was sown by Mr. Fife, but, being a winter wheat, none of it ripened save one plant, which produced three ears. As he wanted a wheat for spring sowing, these ears were saved and sown late — in fact, too late — the following spring, but it ripened quite free from rust when practically all the other wheat in the neighborhood had rusted. From this sprang the wheat known as Red Fife, which made Canadian wheat famous; White Fife being a variety of the original strain." It is stated that, a few years later, in some seed imported by the Canadian Department from Galicia there was one variety identical with the Red Fife introduced by accident over sixty years previously.

Imports and Exports of Fruits and Plants.

During the month of July 6,404bush. of fresh fruits, 127 packages of plants, 11,198 bags of potatoes, and 30 bags of onions were inspected and admitted at Adelaide and Port Adelaide, while 2,974 bags were passed at Serviceton under the Vine, Fruit, and Vegetable Protection Act; 392bush. of bananas (chiefly overripe) were rejected and destroyed. The exports to inter-State markets comprised 7,216bush. of fresh fruits, 3,293pkgs. of vegetables, and 230pkgs. of plants also examined at Adelaide. In addition, 173bush. of fresh fruits were examined and passed for inter-State markets at Clare,

203bush. of fresh fruits at Renmark, 128bush. of fresh fruits at Gawler, 25bush. of fresh fruits and 220 bags of potatoes at Coonawarra, 62pkgs. of plants at Angaston, and 323bush. of fresh fruits at Salisbury. Under the Commerce Act 2,227 cases of fresh fruits, 123pkgs. preserved fruits, 776pkgs. of dried fruits, 4pkgs. of plants, and 50pkgs. of honey were exported to oversea markets during the same period. These were distributed as follows :—For London, 456 cases of citrus fruits and 6pkgs. of dried fruits ; for Germany, 50 cases honey ; for New Zealand, 118 cases of citrus fruits, 89 cases of preserved fruits, 528pkgs. of dried fruits, and 4pkgs. of plants ; for India and the East, 1,360 cases of apples, 93 cases of citrus fruits, 34 cases of preserved fruits, and 12pkgs. dried fruits ; for South Africa, 200 cases of apples, and 230pkgs. of dried fruits. Under the Federal Quarantine Act 539pkgs. of plants, seeds, bulbs, &c., were admitted from oversea sources.

Examination of Stallions in New South Wales.

The Chief Veterinary Officer and Chief Inspector of Stock in New South Wales (Mr. S. T. D. Symons, M.R.C.V.S.) has published in the July number of the *Agricultural Gazette* of New South Wales the first report on the working of the Government scheme of examination as to the soundness and certification of stallions. Like South Australia, New South Wales has adopted the Victorian scheme, of which Mr. Symons approves, and which he says can be looked upon as paving the way to a more advanced and comprehensive measure to be effected by legislation, if necessary, within the near future. The result of the year's work is summarised as follows—

	Draughts.	Lights.	Pomes.	Total
Examined.....	240	247	172	659
Passed.....	142	215	153	510
Rejected ...	98	32	19	149
Percentage rejected ..	40.83	12.95	11.04	22.61

In commenting on the results the report states:—“The veterinary examination for Government certificate, so far as it has gone, has demonstrated clearly—1. That the majority of sires in this State are grades. 2. That fresh blood is required in some classes. Cross-bred horses are not infrequently as fine-looking animals as their pure-bred sires, but the danger to the horse-breeding industry of using them for stud purposes is the undoubted fact that they cannot with any degree of certainty produce their own good qualities. ‘Like begets like’ only when it is backed up by a long line of pure-bred ancestors on both sides, thereby ensuring fixity of type. It would be a misfortune if, in our efforts to improve the breeding of a good, sound type of horse, the evil influence of the grade stallion was lost sight of. It must

be acknowledged that the introduction of fresh blood is very desirable in all classes, but the pony class especially is in danger of extinction owing to repeated and injudicious crosses."

Tillage in its Relation to Soil Moisture.

An article by Mr. C. C. Thom has recently been published by the Washington Experiment Station of the United States Department of Agriculture. It is a brief popular discussion based upon the results of one year's study of methods of soil culture best adapted to the conservation of soil moisture in dry farming. These results especially emphasise the importance of ploughing or thoroughly disking stubble after harvesting in order to store the winter rains, and of disking or otherwise stirring the soil at as early a date in the spring as it will bear cultivation. Decided benefit was also obtained by sub-surface packing of the soil immediately or very soon after ploughing. The scientific reasons for allowing land to be fallow every other season in regions of deficient rainfall are explained. By this means more moisture will be conserved, if a proper soil mulch is maintained, and a store of available plant food will be accumulated which may be of great service to the succeeding crop. "This is especially true with regard to the supply of nitrates, for the practice of bare fallow is favorable to the growth of nitrifying organisms, and consequent increase in available nitrogen." The philosophy of conservation of soil moisture is summed up as follows — "Get as much as possible of the winter precipitation into the soil by a system of thorough fall cultivation. Retain it by an equally thorough system of early spring and succeeding summer cultivation."

Agricultural Distress in Russia.

Some interesting information respecting the condition of some of the agriculturists in Russia is given by Mr. H. O'Beirne, in the Diplomatic and Consular Reports for the year 1908. In comparing the income and expenditure of the Russian Government for 1908 with the figures for the preceding year an account is given of the increasing aid to agriculture since 1871 as a result of rural conditions. It is shown that for the decade 1871-80 the average annual relief amounted to £180,000, and in 1881-1890 it fell to an average of £100,000 per year, "but in the period 1891-1900 it increased to £2,000,000, and in the years 1901-1906, inclusive, it was no less than £1,800,000 per year." The districts suffering most are within the rich black-earth zone of south, central, and south-eastern Russia, where the population is purely agricultural with no industrial centres to relieve the situation.

The growth of distress is attributed to two principal causes -- the insufficient area of peasants' allotments and inferior farming. A sum of £2,521,474 was expended in 1908 for the purpose of relieving congestion by facilitating the migration of peasants to Siberia, and there are also assignments towards the reorganisation of the system of land tenure and the redistribution and improvement of holdings.

Use of Fertilisers in Japan.

Mr. F. H. King, in an article in the *Orange Judd Farmer*, writes -- "Japan is now supporting a population in her four main islands of more than 48,500,000 people and more than 2,600,000 horses and cattle, nearly all of them laboring animals, and all on only 21,321 square miles of cultivated land. This is at the rate of 2,277 people and 125 horses and cattle to each square mile of cultivated land." It is shown that this result is brought about by the careful saving and use of every bit of fertilising material, the use of green manure, and great care in the preparation and handling of the soil. Much of the fertilising material is used in the form of composts. In the article referred to Mr. King describes the methods of composting used in Japan as well as the type of house employed for the storage and protection of the compost, and the composition of samples of the composts, green manures, and ashes used.

The Influence of Forests on Climates and on Floods.

This much discussed question is the subject of a paper recently submitted by Mr. W. L. Moore to a Committee on Agriculture appointed by the United States House of Representatives, in which he draws the following conclusions -- (1) Any marked climatic changes that may have taken place are of wide extent, and not local, are appreciable only when measured in geologic periods, and evidence is strong that the cutting away of the forests has had nothing to do with the creating or the augmenting of droughts in any part of the world. (2) Precipitation controls forestation, but forestation has little or no effect upon precipitation. (3) Any local modification of temperature and humidity caused by the presence or absence of forest covering, the buildings of villages, and cities, &c., could not extend upward more than a few hundred feet, and in this stratum of air saturation rarely occurs, even during rainfall, whereas precipitation is the result of conditions that exist at such altitudes as not to be controlled or affected by the small thermal irregularities of the surface air. (4) During the period of accurate observations the amount of precipitation has not increased or decreased to an extent worthy of consideration. (5) Floods are caused by excessive precipitation, and the source of the precipitation over the central

and eastern portions of the United States is the vapor borne by the warm southerly winds from the Gulf of Mexico and the adjacent ocean into the interior of the country, but little from the Pacific Ocean crossing the Rocky Mountains. (6) Compared with the total area of a given watershed, that of the headwaters is usually small, and except locally in mountain streams, their run-off would not be sufficient to cause floods, even if deforestation allowed a greater and a quicker run-off. Granting, for the sake of argument, that deforestation might be responsible for general floods over a watershed, it would be necessary, in order to prevent them, to reforest the lower levels with their vastly greater areas, an impossibility unless valuable agricultural lands are to be abandoned as food-producing areas. (7) The run-off of our rivers is not materially affected by any other factor than the precipitation. (8) The high waters are not higher and the low waters are not lower than formerly ; in fact, there appears to be a tendency in late years towards a slightly better low-water flow in summer. (9) Floods are not of greater frequency and longer duration than formerly."

Maintaining Fertility in Asia.

In an article in the *Country Gentleman* Mr. F. H. King describes from personal observation the methods followed in China, Korea, and Japan in the utilisation of waste products for the maintenance of soil fertility. It is shown how soils which have been cropped for ages are maintained in a high state of fertility without the use of commercial potash, salts, phosphates, or nitrates. The nitrogen is maintained by persistent and efficient culture of leguminous plants, and the available potash and phosphoric acid by the utilisation of wastes and treatment of the soil which unlocks and recombines in highly available form the essential fertilising constituents. The careful methods which are used in the handling and composting of manures of all kinds are especially described.



INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide "

DESTROYING SORREL

"A. G. K." Peake, writes—"I am sending sample of weed which is taking possession of my garden. It keeps green right through the summer, and every time I dig it under it grows worse than ever. As it smothers everything, I should be glad if you could advise me through the *Journal* how to get rid of it. Picking out the roots is impossible."

Mr. W. L. Summers replies—"The sample is in all probability sorrel (*Rumex acetosella*). This plant usually grows in land slightly sour, and its presence indicates a deficiency of lime. It is frequently stated that a good dressing of lime will assist to rid the soil of sorrel, and this should be tried. The only other plan is to continually worry it by means of the fork, taking the roots out and destroying them by burning. Digging the plant under only assists to spread it. If treated as suggested, especially in the summer months, at short intervals, and lime applied to the soil, it should be possible to reduce the trouble to a minimum."

WORMS IN COWS.

"Belalie North" writes—"Will you please inform me what is a good cure for worms in cows? I have a cow extremely poor, and feeding seems to be useless."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"The owner has not fully described how he diagnosed the condition of his cow as being caused by worms. The poorness of the animal may possibly be attributed to some other cause. The important worms found in cattle are *Strongyli*, existing in the fourth stomach and producing symptoms of anæmia and diarrhœa. Tonics consisting of sulphate of iron (2 drachms) and sweet bone meal (1oz.) can be administered in the feed three times daily; or licks consisting of these ingredients can be put at convenient places for the cattle to lick. Specimens of worms from cattle should be forwarded in spirits and water to this office for identification."

MORTALITY IN BEES.

"W.T." Meningie, writes—"I have noticed some hundreds of bees at the mouth of one of my hives dying. They had come loaded with pollen, and seemed to have dropped exhausted, and at dusk most of them were dead. Can you inform me of the cause, and if anything can be done."

The Inspector under the Foul Brood in Bees Act (Mr. T. E. White-law) replies—"Owing to the details supplied being somewhat scant, it is not easy to state with certainty the actual cause of the bees dying; the possible cause can only be surmised in the absence of personal examination. In early spring and winter bees are tempted by bright sunshine to venture from the hive when the temperature is really too low to render it safe. So long as they are working actively then they are safe, but when heavily laden with pollen they often drop on the cold damp ground, never to rise again. In districts where there are early blossoms, such as tree lucerne, this often happens. Shade the entrance of the hive and lay a flat piece of board on the ground in front of the hive for the bees to drop on and run in easily before they become chilled; ascertain the entrance is clear within. Should you consider the cause more serious you should supply further information as to weather, flowers in bloom, whether the bees are swollen, and signs of dysentery, if so the color of excreta; sending dead bees for examination."

COW SUFFERING FROM WIND.

"Anxious," of Ramco, writes—"Will you please tell me what is the cause and cure of a cow troubled with wind? The animal is about nine years old, and a very good butter cow. The pains are sometimes so severe that she lies down and rolls over and over, kicking all the time."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Causes—Predisposing and exciting. Predisposing—Presence of foreign bodies in rumen or reticulum, debility, &c. Exciting—Peculiar condition of food, moist grass, sudden change of dry food to moist, or from grass to clover or lucerne. Treatment—Certain agents used to decompose gases, *e.g.*, 1oz. to 2ozs. of hyposulphite of soda in a pint of water, or 2ozs. aromatic spirits of ammonia in water, or turpentine 2ozs., raw linseed oil, 1pt. Restrict diet and give dose of Epsom salts and treacle. If rumen much distended and cow distressed and in pain, owner should immediately puncture rumen with trocar and cannula on the left side in the space between the angle of haunch, the transverse processes of the vertebræ of the loins, and the last rib. The application of cold water to the abdomen is sometimes effectual in neutralising gases."

RYE AS PIG FEED.

"E. S.," Port Lincoln, writes—"Can you give me any idea of the value of rye grain as food for stock? Rye does well in this district, and the rabbits do not attack the plant to anything like the same extent as with barley or wheat."

Mr. W. J. Colebatch, M.R.C.V.S., replies—"So far as pigs are concerned, rye ranks almost equal with barley, which is undoubtedly the best of all cereals for the production of high quality pork. When fed alone pigs are apt to tire of it more quickly than of barley, so that it would be better to mix it with maize or barley and feed it in conjunction with dairy by-products. For cattle it is not so suitable, as it is found to impart a somewhat bitter flavor to milk and butter when fed in even moderate quantities. About 3lbs. per milking cow per day is a fair allowance. When mixed in equal amounts with oats and bran, or oats and maize meal, it will furnish a useful grain ration; and if mixed with bran alone, the latter should form not less than one-third of the mass. The grain is all the better for being crushed into meal, as it facilitates mixing, and in the case of pigs hastens the fattening process. With regard to cooking, however, it is doubtful if any advantage is to be gained, except in so far as an occasional change in the form of steamed or boiled feed may break the monotony of the diet, and so stimulate the appetite."

SULPHATE OF IRON AND HORSES' TEETH.

"Merghiny" writes—"I would like to know if sulphate of iron is injurious to horses' teeth."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Sulphate of iron in the medicinal doses used is not considered injurious to horses' teeth."

FEEDING OF LAMBS AND EWES.

"J. B.," Penola, writes—" (1) I am feeding some pet lambs on separator milk. What ingredient would you recommend to add to the milk to make it richer? (2) After ewes become pregnant is it injurious to give them sulphate of iron with the salt? If so, at what period during pregnancy must the sulphate of iron be discontinued, and how would it affect the ewe? "

The Acting Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc., M.R.C.V.S.) replies—" (1) Skim milk is not much used for lambs, but it is very largely employed for calves, and when necessary may be fed to lambs with satisfactory results. It may be strengthened with advantage by the addition of ground linseed or oil meal. The amount of meal required will depend upon the age of the lambs. For very young lambs a teaspoonful will be sufficient, and this should be increased gradually, with due regard to the condition of the bowels. A simple plan is to soak linseed for several hours in water, and then boil it for one hour. This gruel can then be mixed with skim milk as required. As the lambs get older, maize meal, barley meal, or crushed oats may be given in small quantities. (2) Sulphate of iron and common salt alone, or in the form of a mixture, will have no injurious effect on pregnant ewes when taken in such quantities as the sheep are likely to get when the 'licks' are exposed in the troughs in the field. If it has been found that premature births and abortions have occurred where such

tonics are available to the ewes, I am afraid it must be regarded as a coincidence only, as in ordinary doses neither of these tonics can be regarded as abortifacients.'

ROOT-BORER.

"E. H. F." writes, stating that he believes that he has discovered a root-borer at the base of an apple tree, which was uprooted on account of dieback.

The Horticultural Instructor (Mr. G. Quinn) replies—"I would advise you to look for the peculiar borings on the roots. These borings take the form of irregular spiral tunnels, in which, at this time of the year, short, yellowish grubs ought to be found. The peculiar action of the root-borer is to cut off eventually the sap layers and prevent the roots performing their absorbing functions. The root-borer which has proved so destructive in Victoria (*Leptops hopei*) has not been discovered in South Australia, but a closely related species, which was named *Leptops robusta*, has been found, and has been known to kill fruit trees in one or two localities; but the virulence of its attacks is nothing compared to that of its Victorian relation."

KEEPING OF LEMONS.

"H. B." writes inquiring how he may keep lemons into the early summer.

The Horticultural Instructor (Mr. G. Quinn) replies—"The fruits should be fully grown with only the faintest shade of yellow upon the skin when they are cut. They should be snipped from the trees, leaving a very short piece of fruit stalk attached to the lemon. Great care must be taken to avoid scratching the skin of the fruit with the cutters or the finger nails of the picker, or by dropping them into the picking vessel, as the slightest abrasion of the epidermis at this time of the year will cause an opening to be made for mould fungus. This fungus, however, does not appear until some time later. The fruits may be stood in boxes in any open, fairly draughty shed for periods varying from three to fourteen days, according to the dryness of the atmosphere. They should then be sorted, and all showing the slightest signs of injury to the skin in the form of scratches or pricks should be eliminated. They may then be placed in trays or shallow boxes holding from one to four layers, but it must be understood that the fruit does not keep so well as a rule in the deeper box as in the single layer tray. Fruit-drying trays, with sides sufficiently high to prevent the bottom of the tray above pressing the fruit on the one beneath, would be very suitable, the trays being stacked one on top of another to any practicable height. The best kind of room for keeping them over a long period is in an underground chamber with a brick floor, into which the admission of air may be regulated. When first placed in the store abundance of ventilation should be allowed for a few weeks, more particularly when the air is dry outside. This will tend to keep the entire store comparatively dry, and thus prevent any weak spots from being affected by the moist air in the chamber, and will also carry off the heavy carbonic

acid gas which has been exhaled at this stage by the skins of the fruits. There is an advantage in having the stacks of trays placed so that they may be shifted every month or six weeks and the fruit easily inspected, so as the wasters can be sorted out, because these are bound to creep in in limited numbers. This examination should take place more particularly during the first two months of storage, as it is within that period that the greatest number of decaying fruits is found."

FEEDING OF HORSES.

"D. H.," Balaklava, writes—" (1) Is barley likely to do any harm to horses if fed crushed or boiled with hay chaff? We have heard it overheats their blood and makes them break out in sores." " (2) Which has the higher feeding value—cocky chaff, or chaffed straw which has been cut with the stripper and stacked? " " (3) Could you tell me if there is a higher feeding value in 2cwts. of molasses as sold in casks than there is in 1cwt. of molasses fodder as sold in bags, as the price of dry molasses is about double that of the liquid? "

Mr. W. J. Colebatch, M.R.C.V.S., replies—" (1) Although oats are usually preferred to barley for feeding horses, so far as food values are concerned, provided good sound corn be given, it is practically immaterial in feeding draught horses whether barley or oats be used. Apart from the fact that oats are as a rule relatively cheaper than barley there is the stimulating influence which they, and they alone, exert; and, furthermore, they help to maintain the bowels in a nice healthy condition, whereas barley is apt to lead to offensive odors and relaxation. So far as boiling or steaming is concerned little or no benefit is to be derived under ordinary conditions. True, such practices lead to partial digestion of the contained nutriment, but at the same time they bring about more or less complete saturation with water, and this is such a serious disadvantage that, except in the case of invalids or horses needing a change of diet, such preparation is to be avoided. The same may be said of soaking grain in water; but with regard to crushing or bruising there is much advantage to be gained, especially in the case of grains enclosed in a husk. No danger is to be feared from feeding either crushed or boiled barley with chaffed hay, provided the horses are brought to it gradually and are not allowed to gorge themselves. If fed injudiciously they are apt to suffer from digestive disturbances which frequently make themselves known in the form of cutaneous sores. (2) According to analyses made by Mr. A. N. Pearson (late Government Chemist in Victoria) there is practically no difference between food values of cocky chaff and wheaten straw. If we consider the total quantities of ingredients present we find that the cocky chaff is about one-third richer in mineral matters (ash), very slightly poorer in albuminoids and carbo-hydrates, and almost exactly equal with straw in respect of fibre and fat. In dealing with feeding value, however, attention should be directed

chiefly to the amounts of *digestible* material rather than the total quantities present. The following sets out clearly the comparative value of the two fodders as indicated by the amounts of digestible albuminoids, carbohydrates, and fats they contain:—Cocky chaff, .4 per cent. fat; 1.4 per cent. albuminoids; 33 per cent. carbo-hydrates. Wheat straw, .4 per cent. fat; 1.2 per cent. albuminoids; 34.5 per cent. carbo hydrates. (3) This matter can only be decided by an examination of analyses supplemented by practical tests.”

MANURE FOR A VINEYARD.

“H. M. L.,” Brighton, asks for particulars respecting the manuring of a vineyard, which is located on fairly heavy loamy soil.

The Horticultural Instructor (Mr. G. Quinn) replies—“I would recommend you to try the effect of 2cwts. of superphosphates and 1cwt. of sulphate of potash per acre. These may be mixed together and put in during the winter season. Where a small area is to be manured the mixture may be sown along in the bottom of the furrow whilst ploughing is in process, putting most of the manure in the four or five furrows which are closest to the rows of vines on each side. These manures would cost about £1 per acre. Where the vines show lack of vitality 1cwt. of nitrate of soda per acre drilled in just when the vines are shooting would prove a strong stimulant to them. This manure would cost an additional 14s. per acre. Phosphatic and potassic manures require to be placed down to the roots, while plenty of moisture is present in the ground; but as nitrate of soda goes into solution at once on contact with the rain or moisture in the soil it should be applied when the roots are in an active condition only.”

BLACK SPOT ON STRAWBERRIES.

“J. F. W.,” of Macclesfield, writes, and asks how he may combat black spot on the leaves of strawberry plants.

The Horticultural Instructor (Mr. G. Quinn) replies—“I suggest cutting off and burning the old diseased leaves and spraying the plants several times, if necessary, with Bordeaux mixture, beginning when the young leaves are starting to unfold. Dusting with sulphur during the early summer has also been advocated for this disease. In America, where the strawberries are grown in matted rows, the diseased leaves have, at the end of the season, been mown off with scythes and burnt upon the spot. This procedure apparently does not seriously injure the strawberry plants, but has a checking effect upon the disease. Whether it can be followed here remains to be proved.”

YOUNG GROWTH ON OLD PEACH TREES.

“B.,” of Watervale, inquires how he can make an aged peach tree throw out spurs without having to cut back limbs.

The Horticultural Instructor (Mr. G. Quinn) replies—“No certain method is known whereby a fresh crop of young fruiting wood can be forced out of

old limbs on peach trees. Even if the limbs be cut back to stumps there is no certainty that the shoots will arise in anything like a regular furnishing order, and frequently the limbs, or a fair proportion of them, die completely. Sometimes, however, by making crescent-shaped incisions above the scars in the bark which indicate where branches formerly arose, dormant buds may be forced into activity and fruit-bearing shoots secured. I would suggest the following of this method first before more drastic measures are adopted. The peach and nectarine are practically the only fruit trees that are difficult to manipulate for the purpose of securing young growth on old limbs."

WOOLLY APHIS ON APPLE TREES.

"B.," of Watervale, also inquires how to deal with woolly aphis on apple trees.

The Horticultural Instructor (Mr. G. Quinn) replies—"A number of remedies are known for dealing with this pest, such as tobacco and soap wash, kerosine emulsion, and an emulsion in which red oil is substituted for kerosine. This latter oil appears to be coming into favor, as it is more viscid and evidently clings with greater persistency to the masses of the insects. Whichever of these remedies is adopted the spray should be driven with great force into the bunches of blight so as to beat down the woolly covering upon their bodies. If a limited number of trees is to be treated the diseased patches may be painted with pure kerosine during the winter time, rubbing it in with a stiff brush. There is no absolute remedy for this pest, and all artificial measures of this nature have to be repeated from time to time whenever the pest appears."

A COMBINED FUNGICIDE AND INSECTICIDE.

"E. H. F.," inquires whether he could mix red oil, which he is using against woolly aphis on apple trees, with Bordeaux mixture in order to form a combined insecticide and fungicide.

The Horticultural Instructor (Mr. G. Quinn) replies—"I can find no record of this combination being made, but a somewhat similar recipe is given in the Journal of the Royal Agricultural Society of England of 1909, where solar distillate, which is a much lighter paraffin oil, has been blended with Bordeaux mixture as follows:—Copper sulphate, 10ozs.; limewater, 8galls. 3pts., or, say, $\frac{1}{2}$ lb. of freshly slaked lime; solar distillate, 24ozs.; and water to make 10galls. of spray. The method of preparation is—Dissolve the copper sulphate in water and add the limewater; then churn in the oil and bring it up to 10galls. with added water. This is reported to act both as a fungicide and an insecticide, aphides and thrips being destroyed by this wash. According to Mr. Spencer Pickering (Director of Woburn Experiment Station, England) caterpillars are also killed by it. While the heavy red oil might not prove suitable, I should like to see it tried on a few trees experimentally, and to know the effect on the tree as well as upon the insects and fungi."

HINTS TO INTENDING IRRIGATIONISTS.

ERECTION OF PUMPING PLANTS.

By S. McINTOSH, Superintendent of Irrigation and Reclamation.

There is nothing so disheartening to the amateur irrigator who has to provide his private water supply than to realise, after due consultation with theoretical experts and a very considerable expenditure in labor and hard



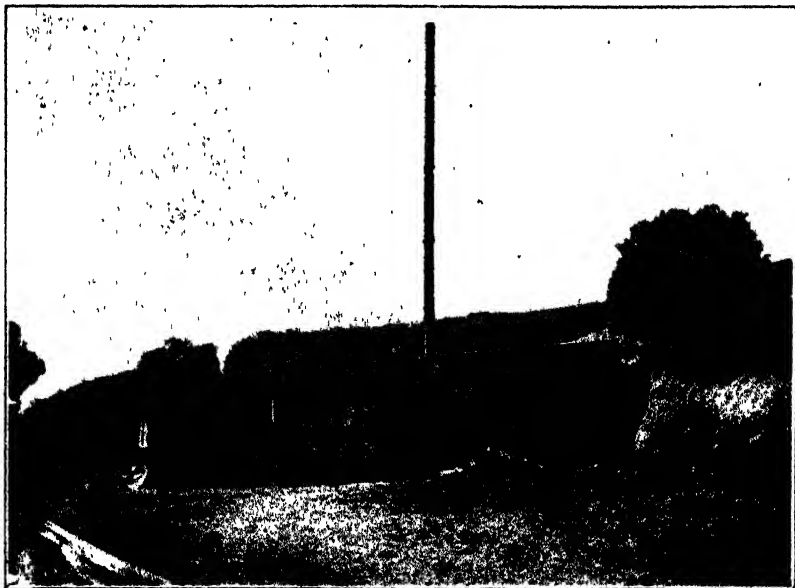
**Badly Selected Site for Pumping Station, Holder Village Settlement.
(NOW ABANDONED.)**

cash, that his venture results ultimately in comparative failure through causes which might have been avoided had he first secured and followed the advice of anyone experienced in successful, practical, and economical irrigation. In the past thousands of pounds have been foolishly squandered by beginners in the purchase of unsuitable machinery, attempts to irrigate with short or bad water supplies, the selection of unnatural irrigation sites, and in various other ways. Surely we should benefit from such examples instead of blindly repeating them. Nevertheless, the average beginner figures out that he knows

all there is to learn in the business, and in nine cases out of ten finally decides that a little practical guidance would have saved him much worry, labor, time, and cash.

OBJECT IN ERECTING A PLANT.

The sole object of the practical man is to provide the means of supplying the difference in quantity between the mean annual rainfall in his own particular district and the actual quantity of water necessary to produce the maximum yields of production per acre. Roughly speaking, the total amount of moisture required to secure this result, with careful cultivation and judicious application of the artificial supply on an average soil, is estimated at about 30in. Assuming 12in. to be the annual precipitation, this leaves a balance of 18in. to make up, to which should be added another 4in. (a low estimate on large areas) for evaporation and seepage losses when the water is delivered



Holder Estate Pumping Station—New Site.

through open flumes and channels. The proposed plant must, therefore, be capable of supplying a total of 22 acre-inches, or approximately 500,000galls., per acre per annum distributed over the seven or eight months known as the irrigating period.

QUALITY AND QUANTITY OF WATER AVAILABLE.

The first consideration is the quality of the water, *i.e.*, its suitability for assisting in the successful growth of economic plant life. This is rather

a difficult problem to settle, as so much depends upon the nature and amount of the alkali contained in the water, and also the general character of the soil to which it is applied ; but it is a generally accepted rule that the water should not contain more than 70grs. of carbonates (other than calcium) and chlorides per gallon, although in Egypt a mineral content of over 200grs. per gallon is recorded as having been used. We have no table showing either the various proportion of salts or the result derived from the use of such water as compared with the lower percentage. Wherever the water contains over 50grs. of injurious or excess alkali to the gallon the greatest care should be exercised in the selection of the land intended to be irrigated. In the first place it must not contain more than one-fifth of 1 per cent. of chloride of sodium or common salt, the generally accepted axiom being that any soil containing more than one-fourth of 1 per cent. of the enemy renders it unfit for most culture plants ; secondly, it must possess a thorough drainage.

A successful irrigation plot should possess a good sandy loam from 9in. to from 4ft. to 5ft. in depth over a fairly retentive marl and clay subsoil, and with a slow but perfect drainage. Pure sand or gravel for any great depth, limestone rubble on the surface and to a depth of several feet, close and heavy clay or closed in flats of a clayey nature without any natural drainage or get-away for the excess water, which is sure to accumulate earlier or later if such soil is irrigated, are to be carefully avoided if it is desired to run the venture at a profit.

SELECTION OF PLANT.

The water and soil proving satisfactory, we now arrive at the selection of the plant itself. This is naturally guided by either the quantity of water or land available. With areas of an acre or less in extent, provided the site is exposed and prevailing winds may be depended upon to supply the necessary driving power, a strong modern windmill and pump, both of approved design, with a storage reservoir to hold from a thousand gallons of water upwards, should meet all requirements. If the irrigator possesses that now fairly common adjunct to farm economy, viz., a portable oil engine or motor, with the addition of a small centrifugal pump, a safe auxiliary is provided in maintaining the necessary water supply in the event of a long continuous spell of calm or hot weather. Wherever practicable use an up-to-date centrifugal pump. For areas of from an acre up to 100 acres an improved oil engine or motor (paying due regard to economy in consumption of fuel) is recommended. From 100 acres onward, where the firewood supply is plentiful, cheap, and permanent, the good old reliable steam plant can safely be depended upon to give satisfaction ; but where the natural fuel supply is at all doubtful the latest type of gas producer plant takes and will maintain first place until such time as it is displaced by a new and more economic power. In the selection of a pumping plant of any considerable capacity the opinion of a competent and practical engineer should be first secured and followed.

Since these notes were commenced the bulletin issued by the University of Arizona Agricultural Experiment Station dealing with "Pumping Plants for Irrigators" has been brought under my notice, and as it fully endorses and supports my views and experiences I quote from it as follows:—

PUMPS.

The advantages of the centrifugal pump for the individual irrigator are so conspicuous, and its adoption so general, that the discussion will be confined to that type.

Pumps are usually purchased wholly on the reputation of the makers and without regard to details of construction. Both open and closed runners give high efficiencies if well designed and built. Much depends on whether the channels and blades are finished or left rough. Machining these surfaces adds materially to the cost, but greatly reduces the friction and eddying of the water. In the best pumps the impeller, if enclosed, is cast in two pieces, and all the surfaces of impeller and casing are machined and polished. Many pumps have only the runner machined. There are also many makes of pumps which are left entirely rough. These last are of very poor construction, very inefficient, and should not be purchased. The bearings of the pump shaft, or at least the outboard bearing, should be self-oiling of the ring-oiling type, end thrust should be compensated, and the packing gland should be of approved construction.

Where electric power is available, pump and motor should be direct connected on the same bed plate. Such a plant requires the very minimum of attention, and should give a combined efficiency exceeding 48 per cent. Such a unit can be set deep in a well pit, just above the water level.

If the water table fluctuates greatly between wet and dry seasons a horizontal pump must either be set so high that the suction is apt to be too great or else it runs a risk of being submerged. A vertical pump can be run submerged, and is especially adapted to cases in which the water table rises and falls greatly, or to cases where the water level drops to the limit of suction when pumping begins. It is advisable to keep the suction lift less than 12ft. If this cannot be done with a horizontal pump, then a submerged vertical pump should be installed.

Centrifugal pumps are exceedingly sensitive to change of speed, and in each installation the most efficient speed should be determined and then maintained. A revolution counter should be purchased with every pump. The cost is only 6s. 3d. Overspeeding may be justifiable sometimes, but never should the speed fall below the best speed.

Deep well pumps should be used in drive wells if the water level is at a considerable depth and the well is driven from the surface of the ground. Pumping by air lift is entirely feasible, though of low efficiency. A greater draught may be made upon a poor well by an air lift than by any other method; but the cost of pumping is high, and air lifts are not recommended where the lift exceeds 80ft.

POWER.

The choice here is very wide. Gasoline and steam engines occupy the field at present. Suction gas producers, hot air engines, and internal combustion engines using crude oil give promise of coming into use. Suction gas producers, especially, are well adapted to Arizona conditions, and will furnish cheaper power than any other type of plant except water power. They are only available for plants larger than 15 horsepower.

Large irrigating plants should have a competent engineer. The small irrigator is usually not a mechanic, and besides he is a very busy man. He needs an engine which will work with a minimum of attendance and repairs. A breakdown in the dry season may mean ruin. Small differences in efficiency are often outweighed by other considerations. The greatest care should therefore be taken to select an installation which will give the least possible trouble afterwards.

The symmetry of a pumping plant deserves far more consideration than it usually receives, especially in the case of gasoline plants, where the fuel bill is the principal item in the cost of pumping. If the engine is too light the speed of the pump is too low; if the engine is too large its own efficiency is greatly reduced. *Both engine and pump should work up to full rated capacity, or nearly so.*

The symmetrical design of a pumping plant is not a simple matter, and usually additional advice to that of the selling agent should be obtained. One unfortunate irrigator was recently observed to have around his well two boilers, two engines, and three pumps. He stated further that he had sent for a fourth pump and thought he might have to change

engines again. By this "cut and try" process a satisfactory plant may ultimately be obtained, but the process itself is ruinous.

The attendant of a gasoline engine should learn how to adjust his engine so that the ignition will be timed properly, and the explosion as strong as possible. The spark should pass a little before the piston is at the end of its stroke—in the case of a high-speed engine, about five-eighths of an inch.

PIPING AND CONNECTIONS.

There are many seemingly unimportant details which are under a purchaser's control and which, if neglected, cause great leakages of power and increase in cost of pumping or decrease in amount of water pumped. It has been our observation and experience that the worst features of recently installed plants have been in these minor details, and the consumption of fuel has been found doubled in many cases from this cause.

The pulleys ordinarily found on centrifugal pumps are so small that with the irrigator's usually loose belt the loss by slipping is very great. Larger pulleys for both pump and engine should be specified in the original order. Idler pulleys should be avoided, and friction clutches are unnecessary.

The belting best adapted to this country has been found to be a six-ply canvas stitched belt of the Gandy make. It is a perfect outdoor belt, while a leather belt rapidly goes to pieces if allowed to get wet, and a rubber belt does not stand a hot and dry climate. The Gandy belt may be estimated at about eight cents per foot per horsepower, assuming that it is run at an economical speed. A belt connection should not be less than 16ft. centre to centre of pulleys.

The foot valve with strainer, usually unsuspected, is undoubtedly a great offender. The strainer rarely has sufficient waterway. It should be of very ample and generous size, and the foot valve should be abandoned. Either a check valve placed immediately above the discharge opening of the pump, or, even better, a flap valve which can be lowered over the outlet of the discharge pipe, should be used. In either case the pump can be quickly primed by means of a pitcher-pump attached to the pump casing or by a steam siphon. The siphon, or ejector, is recommended for all plants operated by steam power.

The suction and discharge pipes should be materially larger than the pump openings. Doubling the diameter of a pipe reduces the internal friction loss to about one thirty-second of its value, assuming the discharge to remain unchanged, and reduces the energy head of the escaping stream to one-sixteenth of its value. The advantage, therefore, of large size piping is readily apparent. The following sizes of piping are recommended for the more common makes of centrifugal pumps:—

Diam. of Pump Opening. Inches.		Diam. Suction and Discharge Pipes. Inches.		Diam. of Pump Opening. Inches.		Diam. Suction and Discharge Pipes. Inches.
3	....	5		6	....	10
4	....	6		8	....	12
5	....	8		10	....	15

Where two suction pipes are used, the diameter of each should be that of the pump opening. The discharge pipe should be connected through a tapered increaser about 4ft. in length, and the suction pipe should be connected through a reducing elbow or a straight increaser.

The pump should be placed so low that the suction lift is as small as possible, or it may run submerged in the case of vertical centrifugal pumps. When the pump and pipe joints are well packed there is no advantage in the lower lift except for the easier priming, but when a gland packing becomes worn the efficiency of the pump is lowered by a high suction head. Suction of more than 20ft. is difficult to maintain with any pump, but more especially with centrifugals. The suction pipe, however, should be considerably longer than 20ft. to prevent air from being sucked down the side of the pipe.

If elbows are necessary, they should be of the "long sweep" type. Steam fittings have usually been employed, but a column of water does not change direction with the same ease as steam. The cost of the long sweep fittings is no more than that of standard steam fittings.

For low lifts it is not necessary to purchase standard pipe for discharge pipe, as riveted galvanized pipe does equally well and is cheaper.

TESTING THE PLANT.

Finally there should be installed near the outlet a weir box for measuring the water pumped. The lift from the water level in the well (while running) to the top of the outlet should be measured in feet. The useful horsepower accomplished can then be computed in the following manner:—Discharge in cubic feet per second multiplied by lift in feet and divided by 8.8 gives the useful horsepower.

An operator usually knows the approximate brakepower of his engine, and if the useful power is not from 50 per cent. to 60 per cent. of the rated brake horsepower, he should seek out the reason why, and make the needed improvements. It is assumed that the engine is running up to its full capacity at the time when the test is made.

SUGGESTIONS AND PRECAUTIONS TO BE REMEMBERED.

1. If you seriously contemplate going in for irrigation, thoroughly discuss the subject with and accept the advice of a successful agricultural and horticultural irrigationist or engineer with some local experience.

2. Rigidly close your ears to purely theoretical irrigationists who would attempt to persuade you that irrigation under any conditions must prove an unqualified success.

3. Should you be so situated that you cannot secure the desired information in the matter, be guided as follows:—

(1) Be sure the quality of the water is suitable and the supply sufficient for your anticipated requirements.

(2) Satisfy yourself as to the suitability of the cultivation site for economical irrigation.

(3) Secure a written guarantee and insist upon a practical test from the firm supplying the plant, so that in the event of its not meeting your specified requirements you incur no expense or loss.

(4) Remember the watchwords of the irrigator are—efficiency, economy, and simplicity, or, translated into every-day language, an efficient supply of fresh water applied to suitable soil with the greatest degree of economy through the medium of the simplest machinery.

(5) Erect your plant as near the actual water supply as is consistent with safety and economy.

(6) Be sure your foundations are solid and permanent.

(7) If engine power is required, erect a suitable and as nearly as possible sand-proof shed over the whole plant at once. Do not wait until it has been partly ruined by exposure to the elements.

(8) Remember the maximum suction in practical work is from 20ft. to 24ft.; consequently keep your pump as close to the water level as is practicable.

(9) Suction pipes should be straight if possible, and the lower end should not be less than 2ft. below the lowest water surface level.

(10) Do not vary the diameter of your suction pipes, i.e., follow the table and maintain the one size suitable to your plant.

(11) Suction pipes must be kept rigidly free of all air leaks if you wish to maintain an efficient water supply ; the flame of a lighted candle, if held near the leaking joint, will disclose the smallest leak.

(12) If a valve is necessary, make sure its area is sufficient and equal to the diameter of the suction pipe. Use either a head valve, in which case an air ejector is necessary to create the necessary vacuum in the pump chamber and the suction pipes, or a foot valve placed in the pipes as close to the bed of the pump as is convenient, where it can be examined without the necessity of hauling up the full length of suction, or the employment of a diver in the event of it going wrong.

(13) Discard the usual *strainer*. If one is necessary, construct it out of galvanized wire or bars, with at least four times the cubic capacity of the original.

(14) Use both suction and delivery pipes in accordance with the table. Do not let the machinery agent coerce you into accepting anything less.

(15) Do not use pipes with a rough inside face.

(16) Never use a short right angle bend. Insist upon long bends or sweeps wherever they are necessary.

(17) Do not pump your water higher than the point at which the bulk of it is actually required. If the lift and area warrant it, provide offtakes and stopcocks at the various levels.

(18) Keep your flumes and channels clean and in good repair.

(19) Maintain an adequate supply of fuel, oil, &c., commensurate with all reasonable requirements. Do not leave it so that you have to procure them in the middle of a heat wave, when your crops require prompt attention.

(20) So arrange everything that you can run the plant and irrigate at night during excessively hot weather.

(21) Promptly dismiss the lazy or careless attendant if you desire a constant and efficient water supply.

(22) Keep all glands well packed, bearings properly lubricated with the best brand of lubricant, and the plant maintained in good order generally.

(23) Supply your crops with a drink at the right time, *i.e.*, when they require it. Do not wait until they are languishing or dead before you commence irrigating.

(24) The successful irrigator must of necessity be a thinker, a close and careful observer, and must follow common sense practices throughout.

AGRICULTURE IN OTHER LANDS.

II. GREECE.—Wines, Currants, and Crops.

By PROFESSOR PERKINS, Principal of Roseworthy Agricultural College.

Marseilles, May 10th, 1910.

From Egypt I passed over to Greece, where I spent four weeks. From thence I visited Asia Minor and Constantinople, and am now on my way to Tunis and Algeria. I propose for the present submitting a few observations collected in Greece.

I wish to state at the outset that, beyond furnishing in some instances the confirmation of some of our own practices, there appears to be little that Greece can teach us in the matter of agricultural practice. In this direction, indeed, the Greeks themselves—at all events many of those with whom I was brought in contact—appear conscious of some flaw in their armor. The complete absence of that vaunting and cocksureness which we are apt to consider the natural attributes of southern Europe must agreeably impress the casual visitor. Much of this no doubt is the wholesome fruit of prevailing financial depression, for the existence of which Greece alone can hardly be held responsible. In Greece one sees no evidence of that prosperity so characteristic of Egypt, but much humble recognition of failure, which assuredly augurs well for the future. The Greeks and their deeds are too frequently decried by those who overlook the short period of years that separates them from six centuries of servitude and stagnation. Rather should they be praised for what they have been able to accomplish in so short a period of time, heavily handicapped by racial degeneration.

The present population of Greece is said to be 2,632,000, or about 107·3 to the square mile. The total imports in 1908 were represented by £6,105,415, or about £2 6s. 5d. per head of population; and the total exports by £4,369,773, or about £1 13s. 4d. per head of population. Great Britain is by far the best customer of Greece, and also heads the list of countries from which commodities are imported. Next in order of purchasing countries come Austria, America, Germany, Holland, &c., whilst after Great Britain the bulk of the imports are derived, in order of importance, from Russia, Austria, Germany, Turkey, Bulgaria, &c.

One must note with surprise that in a country devoid of large manufacturing and mining interests, and which must therefore be dependent on what the soil can be made to produce, the bulk of the imports should be classed under the heading of "Agricultural Products," which in 1907 were valued at £1,902,604 out of £5,962,700.

Similarly under "Live Stock" we find in 1907 £51,478 worth of large cattle imported; and in a country the hills and short pasture of which are pre-eminently suited to sheep and goats as much as £56,145 worth of the latter are imported. Additionally £2,698 worth of pigs, and even £5,278 worth of poultry are brought from foreign countries.

It is not easy in the course of a few weeks' visit to form a correct estimate of the agricultural resources of a country that has not yet realised the importance of the systematic collection of agricultural statistics. The position will be more readily understood when it is stated that the absence of any general survey of the country has hitherto prevented the imposing of a land tax, and that in consequence the Greek farmer is not taxed in proportion to the land he may possess, but in proportion to the number of ploughing oxen he is able to keep—a truly primitive expedient, establishing a premium on poor, indifferent tillage. The facts I have been able to collect on the subject I owe very largely to a perusal of consular reports, kindly placed at my disposal by His Excellency the British Plenipotentiary (Sir Francis Elliott) and to verbal information supplied me by Mr. Chassiolti (Director of the Athens Agricultural Station) and other agriculturists whom I had occasion to meet. In the course of my wanderings, too, I have endeavored to keep my eyes as well as my ears open.

In the first place it appears to me that the country suffers from certain physical defects which must ever hinder it from becoming a truly great agricultural country. The rocky hills, the brilliant sunlight, which form the indescribable charm of Greece, do not contribute much towards agricultural fertility. Certain portions of Greece, it is true, are frequently described as exceptionally fertile. I fear, however, that the term is very largely relative, and that it is only by contrast with the vast masses of limestone rock that what would elsewhere be looked upon as very medium soils are here described as fertile. I must say that personally, apart from a few sheltered valleys of moderate area, I saw no important tract of country that could be described as fertile. To this must be added that the rainfall is rather scanty, particularly in the Peloponesus.

Nature, however, is not alone to blame for poor agricultural returns. It is to be feared that the apathy and indolence of the population must take its share of blame. Greece was at one time a well-wooded country; indeed, there exist vast tracts of country which if treated intelligently as forest lands would prove both directly and indirectly of great advantage to the State, which are now nothing but barren wastes, affording a scanty existence to a few goats. Unfortunately the Greek does not love trees. Witness the way in which he is constantly pollarding and torturing the trees of his avenues and city squares. Within recent years, I am told, vast areas have been laid bare of their forests; and if destruction is allowed to continue unchecked, Greece will be practically treeless in the course of a few years.

The deteriorating influence of deforestation on climate is too well known to need insisting upon; indeed, to it we may attribute some of the present agricultural misfortunes of the country.

The principal indigenous forest tree in Greece appears to be the Aleppo pine (*Pinus halepensis*), which thrives so well in the drier districts of South Australia. The Greeks extract from it a certain amount of resin, as is the case with the Maritime pine in the south-west of France. In lesser quantities there are three species of oaks, chestnuts, horse chestnuts, elms, ash, &c.

Currants form one of the principal articles of export in Greece, and as, unfortunately, production appears to have overtaken the requirements of the world's markets, currants have within recent years proved a disturbing factor in Greek economics. Curiously enough, it is the English-speaking world alone that finds room for the currant in its ordinary dietary; hence in this direction Great Britain and America are practically the sole customers of Greece; and, unfortunately for Greece, within recent years California has shown itself able to produce both currants and other dried fruit, which tend to replace currants in domestic arrangements.

Prior to 1870 the average currant crop appears to have been about 75,000 tons, the whole of which found a very ready market. Towards that time European vineyards began to die out before the attacks of the phylloxera, and as in the south of Europe wine practically forms a staple article of diet of the whole population, wine merchants proceeded to buy up in the East all dried fruit available, including currants, from which wine could be made. The misfortunes of European vinegrowers gave a tremendous impetus to currant-planting in Greece, with the result that production at the present time is between 185,000 tons and 190,000 tons a year. So long as Europe required currants for wine-making purposes there was no particular difficulty in disposing of this large crop. In the course of time, however, European vineyards were gradually built up again on American stocks, and this particular opening for surplus currants was lost. At the present moment the world's consumption of currants is much below the annual production of Grecian vineyards. Thus, according to Mr. Alban Young, in his report on Greek finances for 1907-8, the world's consumption of currants in 1905-6 was represented by 112,500 tons, in 1906-7 by 116,000 tons, and in 1907-8 by 120,000 tons.

Thus each year a heavy surplus has been left on the hands of growers and merchants, with the result that the market has become completely disorganised. The importance of the interests concerned has been so great and the outcries so emphatic that for the last 15 years or so the Government has been endeavoring by special legislation to dodge the economic Nemesis that threatens Greek currant-growers. It is unnecessary to detail all the expedients that have been resorted to; it may be stated, however, that for the most part they appear to have been illusory. In ultimate resort the further

planting of currant vines has been prohibited by law, and a new law has been introduced, giving power to the "Privileged Currant Company" to cause the uprooting of surplus vineyards, subject to the payment of adequate compensation.

That the currant industry is in the throes of a painful crisis must be evident to anybody cursorily examining the vineyards. Many of the latter are very carefully tilled and cared for; but, on the other, hand many appear to be wholly abandoned and neglected. I was informed by Mr. F. B. Wood, British Consul at Patras, who is himself a currant-grower, that in present circumstances currant-growing is unremunerative to the large grower who has to pay for labor, and that in consequence currant-growing is rapidly falling into the hands of peasants, who do all the work with their families. According to Mr. Wood, the working expenses of a currant vineyard are represented by 70 drachmas per stremma, that is to say, about £11 an acre. This estimate certainly appears very heavy, particularly when labor is only paid at the rate of 2s. 6d. a day for men and 1s. 3d. a day for women. It should be noted, however, that absolutely everything in the currant vineyard is done by hand; that plough, harrow, or cultivator is an unknown thing here. The vineyards appear to be very irregularly planted; originally individual plants seem to have been placed between 3ft. and 4ft. apart. Considerable irregularity arises subsequently from the practice of frequent layering, which appears to be very largely adopted for increasing the existing number of plants, or for renewing old ones that have become injured or effete. The main winter tillage consists in mounding up all the earth in a central pyramid, having four vines at its base. This form of tillage, although very perfect, must be very costly. The work is done by hand with a heavy, short-handled hoe. Both women and men take part in it in long, cheerful gangs. I have seen as many as 20 at a time working together in a vineyard not four acres in area. Subsequently in spring, after the fall of the bulk of the rains, these mounds are levelled down, and what weeds may have sprung up destroyed. The vineyards do not appear to receive any further summer tillage beyond perhaps occasional hoeing up of rank weeds. I was informed by one grower that the work of tilling over a vineyard twice could be done by three men to the stremma, or 12 men to the acre; and as in the Peloponesus alone there is as much as 250,000 acres under vines (including wine grapes, which are similarly treated), the tillage of the soil affords a vast amount of occupation to the peasantry.

I was not much struck with the way in which the vines are pruned. This operation appears to be carried out rather carelessly, much less well than is the case in the Smyrna vineyards which I visited later on. Old vines carry long, straggling arms, and are covered with dead wood. They are trained to very irregular gooseberry bushes, carrying as a rule three to four rather long spurs. Where Sultana vines are grown one or two rods appear

to be used in addition. It should be stated here that in Greece the Sultana is used very extensively as a table raisin. A sharp pruning hook is employed for all pruning operations.

The vineyards in Greece are subject here to both downy mildew (*Peronospora*) and to oidium. To protect the vines against *Peronospora* the vineyards are sprayed two or three times during the course of a season with Bordeaux mixture (copper sulphate and lime); and against oidium they are dressed with sulphur three or four times, according as the season is more or less damp. Fortunately the phylloxera has not yet been discovered in Greece.

All currant vines are ring-barked early in May, just as the fruit is beginning to set. The general practice consists in making a single incision through the bark on the stem; although in Volstizzia, the best currant district, the incision is generally placed around the main branches of the vine. The plants are said to suffer less from this practice. According to Mr. Wood, ring-barking has had the effect of increasing the size of the fruit and raising the total yield of the vineyards, but, on the other hand, it has reduced the quality of the currant. The best quality currants proceed from the neighborhood of Volstizzia and Corinth, in which districts the average yield per acre is relatively low.

The vines themselves are neither trellised nor staked, but each season individual shoots are supported by short bamboo stakes, so as to prevent the fruit from being soiled. This in itself must prove a costly yearly operation.

The bulk of Greek currants are sun-dried on the ground on specially prepared floors. It is stated that this practice results in finer and plumper currants. I was informed that in Volstizzia there is a tendency to dry the currants in the shade under a shed. They are placed on open wire trays, which are piled up one above the other, with plenty of room both above and below for air. When the autumns are sufficiently warm for the purpose, currants dried in the shade are of superior quality; they are said to be softer, more elastic, and of better general appearance. On the other hand, they are apt to rot in the event of cold weather setting in before the drying process has been completed.

The yield of dried currants per stremma is between 300lbs. and 1,000lbs. to the stremma, that is to say, from half a ton to 2 tons to the acre. The currants are said to dry at the rate of three of fresh fruit to one of dried.

With a view to ascertaining the position of the Australian grower relatively to a possible export trade, I asked Mr. Wood, who had much experience in the matter, what represented a remunerative price for currants to the Grecian grower. He stated 130 drachmas to the 1,000 Venetian pounds to be a remunerative price; that is to say, a little over £11 a ton.

The best currants are said to proceed from relatively light soils and on gentle hill slopes. So far as can be seen, however, they appear to be planted in every possible description of soil. As a matter of regular practice they

do not seem to be irrigated. One cannot, however, help noticing how everywhere in Greece attempts are made to utilise the winter flood waters, which come pouring down from the bare denuded hills. There is hardly a vineyard or an olive plantation that is not steeply banked up and terraced in order to secure some portion of the water that in the main runs to waste.

I omitted to state that at times, when the winter is cold, it is customary to strip the vines of some of their leaves so that the rays of the sun may reach the fruit bunches more effectively.

The wine industry of Greece is of less importance than the currant industry ; but, as is also the case I believe throughout Europe, it is suffering from the effects of over-production and declining consumption. According to Mr. Alban Young, the area under wine grapes in 1899 was represented by 204,240 acres, which yielded 53,700,000galls. of wine ; whilst in 1908 it had risen to 288,000 acres, which yielded 68,571,000galls. The bulk of the wine is consumed locally. The following figures, taken from Mr. Young's report, represent the extent of recent exports :-

	Wine Exported. Gallons.	Spirits Exported. Gallons.
1899	6,304,677	226,284
1900	4,826,501	68,232
1901	1,966,994	166,939
1902	4,258,834	106,438
1903	10,370,851	125,668
1904	10,120,009	141,465
1905	5,851,331	189,332
1906	6,103,891	485,790
1907	5,936,440	610,870

I tasted some Greek wines of excellent quality, particularly the light white wines. Unfortunately, as was the case with us some years back, they are exceedingly uneven in type, and the label can never be taken as a guarantee of either quality or even soundness. The varieties from which the wines are made were given to me under Greek names. The extent to which they correspond to any of our varieties I am unable to state, as the vines were not in leaf at the time of my visit. The following varieties are principally used for red wines—Mavrondi, Sirikir, Kondoura, and Kranidiondikio, and for white or pink wines—Phylleri, Roditis, Mavrodaphne, Sabatiano, Parachoritiko, Koliniatiko, Skilopnichts.

Although there exist a few large cellars in which wine is made on modern lines, the bulk of the wine of the country is made by the peasants in hovels, and quite unfit for export, because of the free use of resin in the wine. Resin gives a peculiar aromatic flavor to the wine, which, although not altogether disagreeable, is very unusual. The populace, however, appears to have got used to it, and appreciate it accordingly. I was puzzled to understand how such a practice can have come into existence, until, in reply to a question

put to him, a Greek peasant told me that everybody could make *resinato*, i.e., "resined wine," and only experts wine without resin. The position appears to be that the resin is added to the wine as a "preservative," which renders unnecessary the usual essential cellar precautions. I secured the following details from a small peasant winemaker. It is customary to let the grapes get very ripe, so as to have a must corresponding to about 13° Baumé. The fruit is tramped under foot, and for both red and white wines the husks, stalks, and juice are set to ferment in upright wood vats. The cap is pressed down two or three times a day, and fermentation is judged to be completed in five to seven days. The wine is then drawn off into small casks, and resin is added to it at the rate of 4lbs. to the 100lbs. of wine. In about 40 to 50 days the wine is clear and ready for consumption. The casks are neither racked, nor are they filled, and may apparently be left in ullage without ill effects. I am compelled to certify to the fact that the wines were perfectly sound, albeit aromatic. The use of sulphur appears to be unknown, and yet the empty casks were perfectly sweet. Such, apparently, is the effectiveness of resin.

The Greek brandies I found to be of excellent quality, and I should not be surprised to see them take an important position in European consumption.

Although wheat is grown pretty nearly all over Greece, it is found principally in Thessaly, that province which was added to Greece after the last Russo-Turkish war. Unfortunately, this province appears to be in the hands of a very limited number of large landowners, who get their lands worked by the peasants on halves. Recently this arrangement has given rise to a good deal of discontent and rioting, and, whatever may be the merits of the case, it has not led to the best possible utilisation of the land. The average area under wheat is said to be about 1,625,000 acres, to which correspond about 1,250,000 acres under bare fallow. This brings up to nearly 3,000,000 acres the area directly or indirectly connected with wheat. I must add that these figures are merely estimates, as agricultural statistics never have been collected. Occasionally a summer crop of maize may precede the wheat crop instead of bare fallow. Single-furrow ploughs appear to be in general use, although in the reclaimed area of Lake Kopais I saw a double-furrow plough drawn by two pairs of oxen. The bulk of the ploughs used are wooden, similar to those still in use in Egypt. Iron ploughs, however, are steadily becoming more common. The fallows do not appear to be very well worked, and as a result the crops are frequently smothered in charlock and poppies; the latter have the advantage of being far more gorgeously colored and ornamental than those which the Australian farmer is familiar. These fallows appear to be cross-ploughed in spring, but at this time of the year the primitive ploughs in use are quite unfit to bury any heavy weed growth.

The flinty macaroni wheats (*Triticum durum*) appear to be grown principally in the drier plains districts. Of these the principal varieties are

Deve, Arnaout, and Mavragan. In the damper districts and hills softer varieties are grown, principally Rapsani, Zouliza, and Dimenos or two months wheat. This rapid-growing wheat is always spring sown, ripening its grain at the same time as the winter sown wheats. I have forwarded a small sample of it to Roseworthy. The mower and binder and steam thresher have penetrated here, although the bulk of the harvesting is done with the sickle and threshing sledge. The chaffed straw is reserved for feeding horses and cattle. As was formerly the case with us, red rust frequently leads to disastrous losses.

Barley is also very frequently grown, but exclusively the six-rowed variety known to us as Cape Barley. In certain districts it is cut for hay after the flowering stage. I saw several samples of this hay, which appeared to me to have been cut very much later, for it was white, brittle, and heavily bearded. I cannot say that it compared favorably with our good wheaten or oaten hay. It yields 1 ton to 2½ tons to the acre.

Almost every farmer has a small patch of rye. I could not understand why this should be the case until I was informed that it was used for bands at harvest time. For this purpose rye straw is no doubt excellent.

Beans, chick peas, vetches, lentils, &c., are also grown fairly commonly.

Tobacco forms an important crop, the bulk of which is consumed locally, but some of it is regularly exported. Since 1904 the area has declined from 30,370 acres to 16,036 acres in 1908. Exports have also declined proportionately.

Olive trees are met with almost everywhere, either by themselves or associated with more or less stunted vines. The olive production varies between 25,000 and 50,000 tons, the bulk of which is consumed locally. Olive trees are regularly and carefully pruned, and fairly well tilled. The fruit is harvested by threshing the branches with long, flexible willows, which causes the berries to fall to the ground, where they are picked up. Contrary to the usual practice in some other countries, the olive trees are grafted a considerable distance above ground—as much as 5ft. to 6ft.

Both rice and cotton are successfully grown, although as yet only to a limited degree. If cotton can be grown successfully in Greece, within sight of perpetual snow, why not with us, unless indeed harvesting operations are likely to prove too costly?

Finally, we have important areas under orchards, principally fig trees and citrus trees; and, to a lesser degree, stone and pip fruit. The Smyrna figs have been grown here successfully, although the quality of the fruit is not equal to that of Smyrna. It is said that much of the dried Greek figs go to Austria, where they are roasted, ground, and disposed of as coffee.

The quality of the oranges and lemons is unquestionably excellent—superior, it must be said, to our own. Other fruit I did not have an opportunity to sample. Curiously enough, whilst olive trees and orange trees are generally pruned, apricots, peaches, plums, apples, pears, &c., remain usually untouched.

USE OF FERTILISERS IN SOUTH AUSTRALIA.

By W. L. SUMMERS

For all practical purposes the fertiliser year ends on June 30th, and we are now in a position to furnish an estimate of the quantity used during the past 12 months. From my records of importations, and from confidential returns furnished by the manufacturers and importers, I estimate that as nearly as possible 90,000 tons of commercial fertilisers were distributed in this State during the year. This compares with 80,000 tons for the preceding year, an increase of fully 10,000 tons. The Railways Commissioner, in a recent report to the Hon. Commissioner of Public Works, stated that during the 12 months 63,339 tons of fertilisers were carried over the railways, an increase of 12,281 tons over the previous year. The fact that there has been a smaller quantity imported direct at the outports this year would probably account for the difference between this figure and the amount of increase shown in my figures.

Of the total of 90,000 tons a considerable quantity, probably 3,000 tons, is used for gardens, orchards, vineyards, green crops, &c., leaving 87,000 tons for the 1910 cereal crop. The latest figures of the Statistical Department show that, including vineyards, gardens, &c., the average quantity of manure used is 86lbs. per acre. I am, therefore, safe in estimating the average for cereals at 84lbs., so that the 87,000 tons used represent a total of 2,320,000 acres of the present season's crop as manured with commercial fertilisers.

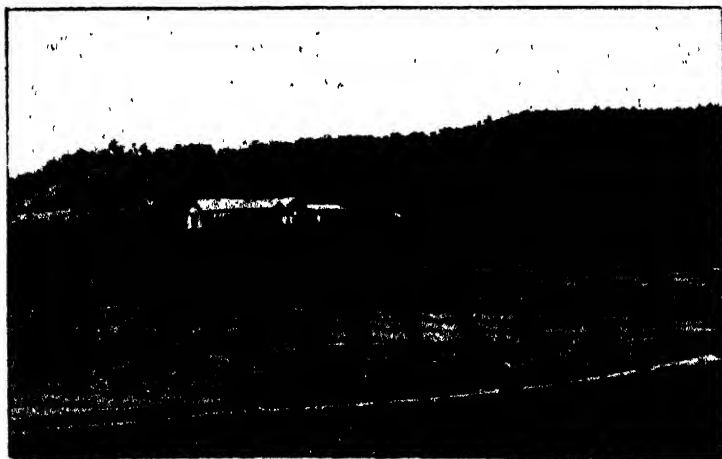
The following figures show the remarkable development in the use of fertilisers for the cereal crops in this State during the past 13 years:—

Year.	Quantity of Manure Used. Tons.		Area of Cereal Crop Manured. Acres.
1898	12,500	..	250,000
1899	16,500	..	350,000
1900	24,600	..	500,000
1901	31,400	..	700,000
1902	37,500	..	845,000
1903	44,500	..	1,000,000
1904	52,000	..	1,170,000
1905	56,500	..	1,265,600
1906	59,000	..	1,321,600
1907	61,000	..	1,366,400
1908	65,000	..	1,456,000
1909	76,500	..	2,100,000
1910	87,000	..	2,320,000

During the past three years the Statistical Department has collected particulars from the producers as to quantities of manures used. The 1909 figures are not yet available, but the figures for 1907 were 60,008 tons, and for 1908 64,842 tons. These figures are naturally under actual consumption, as apart from any farmer's returns, which may be incomplete, many tons are used annually in city and suburban gardens which are not shown in the statistical returns; they indicate, however, that my estimates have been very close to the actual consumption.

Of the total output something like 88,000 tons consist of mineral super., guano super., bone super., and mixtures in which the chief ingredient is superphosphate. Bonedust and bone manures rank next, while Thomas phosphate and the various potassic and nitrogenous manures are represented by very small totals. The Customs returns show that during the 12 months ending June 30th, 1910, about 38,000 tons of manure were imported, but a large percentage of this is retreated in mixtures put up by the local works.

The total increase in the annual consumption during the past five years represents nearly 30,000 tons, and with the development of very large areas of land on Eyre Peninsula and east of the Murray it is quite probable that, given a continuance of fair seasons, the figures for the next five years will show similar increases



ORCHARD AND HOMESTEAD.

PHYLLOXERA.

By H. E. LAFFER, Viticulturist, Roseworthy Agricultural College.

The destruction of vineyards in Europe due to phylloxera has brought all the skill of the nurseryman and vigneron to bear on the problem of evolving and testing types of vines resistant to the disease. Once it was ascertained that many of the numerous species of the American wild vine were practically immune to its attacks, experiments were carried out for the purpose of determining the most suitable varieties.

In the first place, almost without exception, the pure types of American *Vitis* were used, and these with more or less success. Ultimately, many of them were found lacking in some of the features so necessary to their culture, and at the present time they have, for the most part, been abandoned in favor of some of the hybrid types.

Many of the most favored stocks now in use are hybrids of two or more of the American species or else hybrids of American and European vines. These latter, it has been found, have ample resistance to the disease, and at the same time, owing to their partly "vinifera" parentage, show a greater amount of affinity for the European scion, thereby facilitating the work of grafting.

A great amount of time and labor has been involved, no doubt, with many disappointing failures. It entailed, not only establishing fixed types sufficiently resistant to the influence of phylloxera, but also varieties suitable to all sorts of climate, soil, and conditions. Now, however, growers desirous of reconstituting their vineyards have a reliable range of suitable stocks to choose from.

In the early years of reconstitution in Europe the *Riparia* was the stock most favored, as being the one combining resistance with adaptability to various conditions. As a grower it was strong, grafted readily with the European scion, hastening the fruiting and ripening. Eventually, however, it was found that the vines would not last, owing to the scion growing away from the stock. This resulted in a stricture, eventually killing the whole plant.

Experiment with hybrids has proved that many of these are vastly superior to the *Riparia*. For the greater part these hybrids are distinguished by numbers or letters, consisting, as a rule, in the first letters in the names of the vines providing the hybrid. In many instances vines claiming the same parentage have entirely different characteristics. For instance, hybrids 3306 and 3309 are both *Riparia* x *Rupestris*. They differ in general appear-

ance, the former being tomentous and the latter glabrous. In their adaptability to soil they also differ, No. 3306 being partial to a sandy soil, while 3309 inclines more to those of a heavier nature. Another class of hybrids is known as the A.R.G.'s. They are "vinifera" hybrids, their origin being Aramon (vinifera) x Rupestris Ganzin.

Victoria, which among all the Australian States has suffered most severely from phylloxera, some three years ago sent its Government Viticulturist, (Mr. F. de Castella) to Europe, for the purpose of ascertaining what progress had been made in combating the pest. The result of this visit has been the introduction to Victoria of the latest methods for the rapid propagation of grafted resistant vines, and also a full complement of all the most useful varieties. Under the direction of Mr. Castella, these have been propagated, with the result that during the coming season the State nurseries have upwards of a quarter of a million rooted vines to dispose of.

The work of preparing the bench grafts is carried out under the supervision of Mr. G. H. Adcock (Principal of the Rutherglen Viticultural College). He has in his charge a number of lads from 12 years to 16 years of age, who with a little practice become quite skilled in the preparation of the grafts.

At one time all sections were cut with the aid of a specially constructed machine, but now it is found to be more satisfactory when done by hand. Scions and stocks are first graded into uniform gauges by means of a notched piece of iron, and then are taken by the grafters, who rapidly and dexterously cut the sloping sections to form a whip and tongue graft. It is remarkable what degree of accuracy can be obtained after a little practice, some of the lads doing upwards of 1,400 in a day.

Originally the cuttings were planted at the college, but owing to the unsuitability of soil and climate, coupled with scarcity of water for irrigation purposes, this site was abandoned as a nursery and devoted to the testing of various stocks. A considerable area is utilised for the propagation of mother stocks to provide wood for bench-grafting. There are also various vines being tested, many of which are new to Australia.

Rutherglen soils proving unsuitable, the site of the nursery was changed to a portion of the Murray banks at Wahgunyah, where, in the deep, rich, alluvial soil, with unlimited water available, a far greater measure of success is obtained. Ample provision has been made for all the operations to be carried out, and the grafts are constructed, moss calloused, and planted out to strike root. Besides these grafted stocks, large numbers of cuttings are rooted for those who prefer to field-graft their vines, upwards of a quarter of a million being ready for disposal this season. The main stocks in use are hybrids 3306, 3309, 41B, A.R.G.1, and A.R.G.2; also Rupestris du Lot and Rupestris Metallica Cape. The area under cultivation for nursery purposes is approximately 50 acres, provision being made to extend the area in the near future.

The Rutherglen district may be taken in illustration of the destruction caused by phylloxera. Thousands of acres of vineyard have been destroyed, and wherever one may look dead and dying vineyards meet the eye. For several years growers have been cautiously experimenting with American stocks and reconstitution, the results appearing so satisfactory that there is every indication of a fairly general planting during the current season.

Foremost among those who are replanting may be mentioned Messrs. G. F. Morris & Son, of the Fairfields winery. Originally this vineyard comprised some 600 acres, but the phylloxera has gradually killed out the vines. The last of the old vineyard goes out of cultivation this year. The work of reconstitution is being pushed on, and there are now upwards of 150 acres on resistant stocks. One portion of the vineyard is three years old, and during the recent vintage it produced 3 tons per acre of Gordos. This yield may be considered particularly good when the age of the vines is taken note of; in fact, wherever vines were seen at a bearing age the yields were heavy and would appear to be better than on a vinifera stock of the same age. One portion of the young vineyard at Fairfields comprised some 80 acres, planted in September, 1909, with imported French vines. Of these fully 96 per cent. had grown, producing strong, healthy foliage. The general appearance of the plot was excellent, and a splendid advertisement to the vines imported from French nurseries.

As an instance of what can be done by the small grower we may take the case of Mr. Dhreu. Within a couple of miles of Rutherglen township this grower has established a small vineyard on resistant stocks, which, from their growth and fruit production, should prove sufficient answer to those who contend that resistant stocks are not a success. Among the other main vigneron of the district who are dealing with the problem of reconstitution are Messrs. Smith, of All Saints, and Burgoyne & Co., of Mount Ophir.

Regarding the immediate effects of the disease it has been found that the extinction of the vineyards has taken far longer than was experienced in Europe. That our experience will prove the same remains to be seen, should we unfortunately find the disease in our vineyards at any time.

European experience has shown that in soils containing a fair proportion of lime, the destruction of vines has been much more rapid than in those soils comparatively free from this element. It may be, then, that the progress of the disease will be more rapid in our soils, many of which contain a fair proportion of lime.

Probably, if the necessity arises, we shall find some of the Berlandiere hybrids most suitable. They appear for the most part hardy, vigorous stocks, resistant to drought and lime. The true Berlandiere, although possessing resistance to the phylloxera in a high degree, has the disadvantage of striking root very badly. Hybrids of this variety strike root from the cuttings more readily, and are consequently more popular. There are the Berlan-

diere x Riparia (420A and 420B), both of which appear to be very useful stocks, good for fruit production and resistant to drought. Another of the same origin is 34EM, grown largely in the Grecian and Turkish islands and the Levant. Hybrid No. 157-11 (Berl. x Rip.), used a good deal in southern Spain, is a type which is bad for bench-grafting, but satisfactory for working in the field. Of the Rupestris x Berl. hybrids the most promising are Nos. 301A and 301-64.

No. 41B is a vinifera hybrid, its origin being Chasselas x Berlandiere. In spite of its origin from such a weak-growing parent as the Chasselas, this stock is remarkably vigorous and drought-resisting. It gives good results in the driest parts of Sicily and Algiers, and is being largely used in France and Spain, where it is superseding A.R.G.1. There is no doubt that this stock is one specially adapted to South Australian conditions. It appears to be a great producer of fruit, in addition to possessing other valuable characteristics.

Hybrid No. 333 (Carbernet x Berl.) and No. 19-52, a natural vinifera hybrid, both promise to be of considerable value as stocks.

The group comprising A.R.G.1, A.R.G.2, and A.R.G.9 appear as a class to be peculiarly suited to South Australian conditions of climate and soil. Their parentage (Aramon x Rupestris (Ganzin) would give them a first claim to hardiness and fruit production. The first member of the group is probably the best. It is considered somewhat difficult to graft, but is particularly adapted to strong-growing scions. It is probably the best stock for Ohanez, which variety should be of special interest to growers of table grapes in South Australia. It is synonymous with the Almeria, or what is known locally as Daira, the best of all export varieties. It is practically the only suitable grape for export to Europe which we have in South Australia, but so far nothing has been done to establish a trade which should prove lucrative to the growers. A.R.G.2 is said to be somewhat less resistant to lime, although it withstands drought very well, while A.R.G.9 is a stock very popular in Spain, and in parts is preferred to A.R.G.1. These three particular varieties, possessing as they do resistance in a high degree to lime and dry conditions, apart from the facility with which they take the vinifera scion, form a very valuable group of stocks.

Hybrid 1202 (Mataro x Rupestris) is another endowed with a very hardy constitution, and is looked upon with considerable favor. It is considered the best stock on which to graft the Gordo Blanco.

Among other varieties which are being tested with more or less success there are 34E, 62-66, 601, 106-8, and 125-1. No. 34E is a Riparia x Berlandiere suited to dry conditions and limestone soils. No. 62-66 is another of the stocks which adapt themselves particularly to the Gordo Blanco scion. No. 601 (Bourrisquou x Rupestris) is one which appears specially adapted to stiff clay soils. No. 106-8, a complex hybrid, Riparia x (Cordifolia x

Rupestris) in common with No. 125-1 (*Cordifolia* x *Riparia*) are suited to the heavy types of soils through their *Cordifolia* parentage. Siebels' No. 1 is one of the direct producing varieties, its fruit being utilised in the manufacture of Ports.

Of the pure American species in use, the most popular is *Rupestris* du Lot. It is one of the favored stocks in France for poorer classes of soil, and under our conditions promises to be of great value. Probably the greater portion of the resistant vines now established in Victoria are on the du Lot stock and are giving every satisfaction. As a grower it is vigorous, promoting the production of fruit, as well as grafting and rooting freely.

Another of the same species (*Rupestris* Metallica Cape) promises to be of almost equal value. It is a seedling raised in South Africa and is characterised by a peculiar greyish or metallic sheen on the foliage. Hybrid No. 3306 (*Riparia* x *Rupestris*) is one largely used, particularly for land of a sandy nature. Its fellow (3309) of the same origin, is better suited to the heavier class of soil. Another *Riparia* x *Rupestris* hybrid (No. 101-14) takes more after the *Riparia* type than the two previous ones, and is more suited to the soils of a deep rich nature. *Solonis* (*Riparia* x *Rupestris* x *Condicans*) and No. 1616 (*Solonis* x *Riparia*) both suit swampy lands, but have not been found sufficiently durable.

With regard to the actual practice of grafting, it appears to be purely a matter of choice whether the stocks are bench-grafted or worked in the field. Under most conditions, no doubt, the bench-graft is surer, but the field-graft seems to grow more quickly and give a return earlier. After all, given skilful and careful workmen, with good after attention to the grafts, a very high percentage should be obtained in the field.

It was formerly the practice in bench work to make the sections of stock and scion long and acute, with the idea of getting a neater union, and, when completed, the grafts were placed in sand to callus before planting in the nursery. The result of this practice was in many cases an imperfect union of stock and scion, which could only result in weak vines.

Under the new process adopted in Victoria the object is to make the sections as short as possible consistent with a firm union; consequently, under present methods, there is no more than half the surface to be calloused over, with the result that better percentages of stronger vines are obtained. The old style of sand beds has given way to moss or seaweed for callousing. The particular value of the seaweed would appear to lie in its retention of moisture and its freedom from moulds.

The grafted cuttings are packed in layers into large cases each to hold some 2,000. Between each layer and around the sides of the case a good thick packing of seaweed, previously washed free from salt, is placed. When full, a layer of seaweed is put on as a cover; the moss is thoroughly saturated with water and placed in the callusing-room. By means of a charcoal

fire the temperature is maintained at 70° F., the most suitable for callus production. In the course of about three weeks the production of callus is so advanced that the union of stock and scion is practically secure. At the same time, the same formation has taken place at the base of the cuttings and on the sides where buds have been removed, thereby facilitating the production of the root system.

In the old method of callusing in sand-beds under glass frames it was impossible to control the temperature of the sand to the same extent that can be obtained when the whole operation is conducted in a closed building supplied with artificial heat, and results prove the superiority of the moss calloused graft over the sand calloused.

Prior to being planted out in the nursery the cuttings undergo a hardening off treatment by remaining for a few weeks in a room of normal temperature. Once this has been completed, provided conditions are favorable, the work of planting is begun.

The only treatment which the vines receive, in addition to that given to ordinary nursery stock, is the removal of the scion roots. Twice during the growing season these small rootlets are removed, the second time being in the autumn, when a small depression is left around each vine exposing the union of the graft. If this were not done, the scion would develop roots at the expense of the stock, and the whole object of grafting would be defeated.

Although not advisable to create too luxuriant a growth in the nursery, it is necessary that water should be available in sufficient quantities to maintain the vines in a vigorous state of health, producing both roots and crown of a strong character.

For the country concerned with the reconstitution of vineyards on resistant stocks one of the initial problems to be dealt with is the rapid propagation of suitable mother vines to supply a large number of cuttings. To obtain rooted cuttings and plants for this purpose will take a period of several years before a great amount of growth is obtained. On the other hand, by grafting American scions of the required varieties on to healthy vinifera stocks, a large number of cuttings can be obtained even from the first season's growth.

An excellent example of what can be done on these lines is afforded by the Victorian Government nursery at Chateau Tahbilk, on the Goulburn River.

The Tahbilk vineyard is rather unique, because for the past 20 years it has been infested with phylloxera, and yet at the present time, for the greater part, the vines are stronger and more prolific than before they were attacked by the disease. For several years after the spread of the phylloxera through the vineyards the vines suffered, and were apparently dying out. Then, curiously enough, some 200 acres began to recover, and since that time

they have become even stronger than before the attack. The other portion of 100 acres, on somewhat higher ground, died and went out of cultivation.

The reason for this recovery was revealed in a stratum of sand a few feet below the surface. The phylloxera, killing out the surface roots, forced the vines to develop those which had penetrated to the sandy layer, with the result that a strong root system was established beyond reach of the insects.

It is on about 10 acres of these vines that a nursery has been established for propagation of mother stocks. Two and a half acres were grafted with scions of the best available resistant varieties in 1908, the principal one being *Rupestris du Lot*, together with A.R.G. 1, 3306, 3309, 41B, and 1202. The first season's growth from the graft yielded about 10,000 cuttings for bench-grafting, and the growth for 1909-10, which is remarkably good, is estimated to yield a quarter of a million. Further portions are being grafted with all the best varieties, so that in a few years there should be a supply to meet all requirements.

Looking at the devastation in Victoria, and in the Rutherglen district in particular, one can only speculate as to what would be the result consequent on an outbreak in one of our own vine-growing districts. At present South Australia practically controls the wine trade of Australasia, simply through the sheer good fortune of so far escaping the phylloxera. One can only ascribe the circumstance to good fortune, for, looking back to the cause of the Rutherglen outbreak, and then glancing at the more or less indiscriminate importation of plants prevailing in our State some years ago, it is simply extraordinary that we should now be free from the disease.

Of late years, no doubt, the stringent laws regulating the importation of plants, coupled with systematic inspection of vineyards, have done much to minimise the risk, but we must not forget that at any moment we may be faced with the problem.

In Victoria they are doing a great work, and one which will ultimately benefit the industry throughout Australia. The experimental work carried out by the Government officials, Messrs. Castella and Adcock, concerning resistant stocks and the life history of the disease, will provide a fund of information upon which the other States can draw in case of necessity. In our midst will be established nurseries for the propagation of those stocks proven to be suitable to our conditions of climate and soil. At the same time it will have been demonstrated that the American stocks are profitable beyond a doubt, and consequently those whose interest lies in the vine industry will be prepared to replant with confidence in the result.

The example of Victoria demonstrates the futility of wasting a lot of money on compensation. During the early years of the outbreak tens of thousands of pounds were paid to growers as compensation for the uprooting of vineyards, with the result that this land has been devoted to other purposes and may never again return to vine culture. The history of phylloxera

clearly shows that wherever the disease has made a start it was simply a matter of time, in spite of all precautions, when the infection spread throughout the country. Not only that, but in the experience of other countries the disease had existed for a year or two before any material effect was apparent on the vines, and this period was quite sufficient for the infection to be carried over a considerable area of the one vineyard or into those adjoining.

It would appear, then, that should an outbreak occur in any one of our own districts, unless it happened to be in one particularly isolated vineyard, very little would be ultimately gained by going in for wholesale destruction of vines and the consequent necessary compensation to the owners. Strong repressive measures would necessarily be adopted and such a vineyard placed under strict quarantine; but once it became apparent that the disease was not going to be stamped out or confined, then we should have to accept the position and frame our regulations accordingly. So far, wherever it has taken possession, phylloxera has won all along, and one can scarcely see the advantage of rooting up probably hundreds of acres of vineyard when, even with the phylloxera present, these same vines might be productive for a number of years.

Under the South Australian Act the owner could not replant this land with resistant stocks inside a stated period, and consequently this area would be devoted to other forms of culture. On the other hand, a grower has his vines dying out gradually, and when the time is ripe he is more inclined to gradually replant and maintain his normal acreage.

Reconstitution, with vines at £8 to £9 per thousand, is a serious matter, and to the small grower probably means ruin. For the large grower and winemaker the matter is of vital importance, a decrease in production necessitating the laying up of costly machinery, storage vessels, and buildings. It is therefore to the advantage of everyone connected with the industry that the area under production should be at least maintained. The most serious aspect is the effect of reduced production on the export trade which has so carefully been built up, and a setback at this period can only act disadvantageously upon the trade.

So far the State nurseries of Victoria have not been able to supply any great number of stocks, owing to the scarcity of good mother vines to provide cuttings; consequently, large numbers have been imported from the nurseries of Richter, in France, and from the results obtained there is no doubt that, in spite of the long sea journey, they are thoroughly reliable; in fact it is doubtful if a better percentage of growth could be obtained with any vines than that of the 80 acres at G. F. Morris & Sons, Fairfields.

Recently the writer had the good fortune to be present at the Government Cold Stores, Melbourne, to see a shipment of approximately 300,000 of these French vines opened. They were imported by Mr. B. W. Bagenal, the local agent for Richter's, and consisted of all the best wine grapes, with a selection

of some leading table varieties. They could not have arrived in better condition ; in fact, one might say that they were as fresh as when taken from the nursery soil.

No doubt in the course of time Victoria will grow sufficient stocks to supply her own needs and possibly be able to assist her neighbors ; but in the meantime, if planting is to progress rapidly, it is a fortunate circumstance that such good vines can be obtained from France.

For any country importing vines from Europe, no matter what precautions are taken, there is always a danger of introducing one or other of the fungus diseases prevalent in that portion of the globe. It may be borne in mind, however, that under our climatic conditions generally the various species of fungi attacking the vine would probably not do any serious damage. At the same time no unnecessary risks should be taken of introducing any more pests than now occur in our vineyards.

The neighboring State has the advantage, if such it can be styled under the circumstances, of being able to procure many valuable new varieties of grapes at present unknown to South Australia. Of such may be mentioned the Flame Tokay and the Purple Cornichon, two table varieties of extremely handsome appearance which are eminently suited for export. From a South Australian standpoint, however, they are not worth the risk of importation.

Ultimately the whole vine-growing industry will reap the benefit of the results now being obtained in Victoria, and too much praise cannot be given to those who are responsible for the fostering of the trade at the present critical time. Should South Australia also become a victim to the disease then close at home we shall have a supply of tested stocks and reliable data on which to base our actions.

In conclusion I should like to express my appreciation of the great kindness received from various officials in Victoria ; to the Hon. Geo. Graham, Minister for Agriculture ; Mr. Duffus, Secretary for Agriculture ; and to Mr. G. H. Adcock, Principal of the Rutherglen Viticultural College. To Mr. Castella I would particularly extend my thanks for the kindness and interest he exhibited in conducting me through the various viticultural districts, and for all the information respecting the numerous resistant stocks.

LUCERNE-GROWING WITHOUT IRRIGATION.

By S. McINTOSH, Superintendent of Irrigation and Reclamation.

When we consider the success which attends lucerne-growing in other parts of the world under arid and semi-arid conditions, and no doubt often planted in a crude and most primitive manner, it is only reasonable to suppose that with a proper system of up-to-date cultivation and a judicious selection of seed an immense area of land might be profitably planted with this valuable fodder in our State. In California, which possesses a climate somewhat similar to ours, with an average rainfall of about 12in., and without artificial watering, from 1-ton to 4-ton hay crops per acre per year are the rule. At Dickinson, in North Dakota, the State Department of Agriculture are growing without irrigation no less than 217 separate strains of lucerne, including Turkestan (several varieties), Mongolian, Sand lucerne, Nebraska Dry Land, Algerian, Mexican, Utah Dry Land, Arabian Dry Land, and Irrigation, African Oasis, Guaranda, Ecuador, and Peruvian. Amongst them it naturally follows there must be some which are better adapted for dry lands than others, and would therefore yield more satisfactory returns.

Our first object is, if possible, to secure samples of seed of as many of these as can be obtained; hence my previous recommendations to secure by exchange or purchase 50 or more selected strains for trial in various parts of South Australia. In the meantime experiments might be carried out at Loxton, Veitch's Well, Parafield, Kangaroo Island, West Coast, and all other stations, worked under the Department of Agriculture, by carefully fallowing and working up an acre of land or more on each place, and at the proper season planting it down with Turkestan, Provence, Hunter River, Russian, Hungarian, Arabian, South Australian, and American varieties, when, in many instances, the results will, I feel satisfied, prove highly gratifying to all concerned.

In various parts of the State outside of Goyder's line of rainfall lucerne plots are to be seen that have been growing in most unlikely places and under the most adverse conditions for years past. Whilst engaged some time ago reporting upon the proposed reclamation of the Coorong sandhills, below Salt Creek I discovered a small patch of lucerne which apparently years previously had started from one seed, dropped possibly from a horse feeder (it was at an old horse camp). The original plant had apparently been left alone by the stock and rabbits, and in due course seeded; the seed fell to the ground, and the second plants had evidently followed in the production of a further seeding, with the result a patch of lucerne several yards in

diameter; the plants were very small, but they were growing on what appeared to be pure white sand and in the midst of a stunted bush scrub. With the land properly cleared, cultivated, and manured the stand would naturally have made a much more satisfactory show.

With an average rainfall of not less than 12in. on a sandy soil of from 6in. and more in depth, provided the subsoil is a fairly retentive one, possessing a slow but sure drainage, there is no doubt but the more drought-resistant varieties can be grown with a certainty wherever such conditions exist.

The land should be ploughed in winter as deeply as possible, and sub-packed with the Campbell packer (each day's ploughing to be gone over the same day); then proceed as follows:—Keep down all weeds and carefully scarify the land after each shower while the soil is yet damp; sow from 5lbs. to 8lbs. of approved seed about April, so that the young plants may be permitted to make the most of the fall and winter rains. When sowing use from 50lbs. to 75lbs. of bonedust or super. per acre. It is always advisable if possible to put in the manure a few weeks ahead of the seed, but this custom is regulated by the weather conditions, which may prevent its accomplishment. The seed should always be sown in damp soil, and thus ensure it getting a good start on the germinating weeds, which latter must necessarily be disturbed in the process of cultivation.

Sow through the drill or broadcast; personally I prefer the latter system; then harrow with a very light set of harrows or brush in the seed, and follow with a light roller to firm the soil around the seed and facilitate a more rapid germination.

In many of our best farming districts where fallowing and sheep-grazing are regularly practised it is a beneficial and profitable venture to sow from 1lb. to 3lbs. of Turkestan or other approved lucerne with the wheat and manure. In America lucerne is largely sown to restore soil fertility. This fact is borne out by the observations of Mr. Strawbridge in his report on dry farming in America, in which he writes—"In dry country it is principally grown to restore the fertility of the soil. One authority on the subject says Alfalfa solves all problems of cleaning the soil of foreign growth, and is a great fertiliser. It enriches the soil in which it is grown by drawing nitrogen from the air and storing it in the roots. It replenishes the soil with the very qualities upon which the grain places the greatest tax." Seeing that the bulk of our farmers are graziers as well as wheatgrowers, the fact that the growing of lucerne improves the carrying capacity of their pastures and at the same time replenishes the nitrogen supply, no further arguments should be required to induce them to give it a fair trial throughout the State. All lucerne plants must be allowed to blossom once a year if they are intended for a semi-permanent pasture, after which they are grazed off in the usual manner. Stock should never be kept on a lucerne plot for longer than a fortnight (from four days to a week is preferable). This entails smaller paddocks

than usually obtain, but the gain in feed supplies, conjointly with the added length of life to the plant, almost invariably more than justifies the extra expenditure in fencing.

Wherever lucerne is sown the land should be deeply cultivated in autumn, so that it may take in the first rain; a cross-cultivation early in August is also decidedly beneficial to the growth. Arabian promise and be the best variety for grazing. In the Hunter River we have found over 20 distinct strains, some of which appear to be of a more drought-resistant nature than others. These are usually of the American type, which has proved the most unsatisfactory on irrigated and reclaimed lands.

The fact that lucerne once established is a plant difficult to eradicate was at one time a common complaint; it is now considered rather an advantage than otherwise to have it growing in field and orchard. On the Pekina Irrigation Block, experiments in lucerne-growing under irrigation, the Campbell system, and ordinary fallow conditions are being conducted. We are also testing the drought-resistant qualities of the various varieties of seed procurable in the State.

In conclusion I may be permitted to include a rather interesting personal experience with dry land cultivation of lucerne. Over six years ago in the Morgan district I sowed from 5lbs. to 6lbs. of reputed Hunter River seed per acre in a crop of Gluyas Early wheat, which had stooled out; then harrowed and rolled the land. Half the area, about 10 acres, was cut for hay, when it yielded $1\frac{1}{2}$ tons of prime mixed hay per acre. The other half was left for wheat, from which was stripped about 14 bush. per acre. Sheep were then turned into the paddock, when they rapidly improved in condition, cleaning off the straw with the green and partly dry lucerne. The lucerne seed germinated splendidly, and made a fairly thick "stand." This crop remained for the first two years without irrigation, being above the water level, yet throughout that period it gave satisfactory and distinctly profitable growths after each summer and autumn rain. The average rainfall for the two years in question did not exceed 9in. per annum.

When buying lucerne seed be sure and insist upon a guarantee that it is free from "dodder." The most approved implement for the cultivation of lucerne crops is the rotary spike cultivator.

POTATO EXPERIMENTS.

CHANGE OF SEED AND MANURIAL TESTS.

By W. ANGUS, B.Sc., Director of Agriculture.

Last season a series of potato experiments were conducted at Mount Barker and Mount Gambier with the following objects in view:—1. To test the efficacy of phosphatic, potassic, and nitrogenous manures singly and in combination in different varieties of soil. 2. To find out the effect of changing the seed, or to compare the relative productivity of similar varieties of local and imported seed. Reports have been received from the following:—Pope Bros, Mount Barker; Messrs. A. A. Sassanowsky, J. C. Ruwoldt, P. H. Niquet, R. Smith, V. H. C. Kilsby, A. W. Cobbedick, and A. Dow, Mount Gambier.

1. CHANGE OF SEED.

Mr. Sassanowsky reports—

Variety	Source.	Area of Plot.	Produce.		Yield per Acre.
			Large.	Small.	
		Sq. Chains.	Bags.	Bags.	Tons.
1. Snowflakes	Victorian Seed	7.42	50	12	5½
“	Rendelsham Seed ..	3.72	23	5	4½
“	Local Seed	3.34	15	4	3½
2. Brown Rivers .	Victorian Seed	8.21	28½	14½	4½
“	Local Seed	2.00	2½	2½	2½

The soil on which these were grown was a heavy loam with clay subsoil. It will be observed that in the experiments with Snowflakes the imported seed gave an increase of nearly 2 tons per acre over the local varieties. This means a very considerable increase in the cash value of the crop in favor of the imported seed. Again, with the Brown Rivers, it will be noticed that the imported seed gave more than double the yield of the local seed, which would pay a handsome extra profit over and above the cost of obtaining the imported seed.

Mr. R. Smith, of Mount Gambier, had a similar experience with Snowflakes. From one bag of imported Snowflakes he obtained six bags of good potatoes against three bags of potatoes from one bag of the local Snowflakes. Imported

Carmens were also experimented with by Mr. Smith, but, unfortunately, local seed of this variety was unobtainable. The yield was slightly over 3 tons per acre. Mr. Kilsby experimented on light land near Glenburnie, and on heavy volcanic soil near Mount Gambier. On Moorak land he obtained the following results:—

Variety.	Source.	Area of Plot.	Produce.		Total Yield per Plot	Total Yield per Acre.
			Large.	Small.		
		sq. chns.	tons cwts.	tons cwts.	tons cwts.	tons cwts.
Snowflakes ..	Victorian Seed	9½	3 3	0 11	3 14	3 18
" ..	Local Seed ..	10	1 10	0 11	2 1	2 1
Brown Rivers.	Imported ...	9½	2 6	1 0	3 6	3 9½

Here, again, the increase in favor of a change of seed was over 1½ tons per acre. These three experiments seem to conclusively establish the value of a change of seed, and this is quite in accord with the experience of the majority of practical potato-growers.

2. MANURE TESTS.

Whilst the experiments with the change of seed were very conclusive, those dealing with the influence of various manures on the resultant crop were very contradictory. Manurial tests were carried out on rich volcanic loam and poor quality Mount Gambier soil. Mr. Ruwoldt, whose tests were conducted on rich black loam, said that the potatoes grew well until the approach of hot weather, when the growth ceased. A heavy downpour in early March brought them on again, but the subsequent prolonged spell of dry weather dried them up completely.

Plot No.	Dressing.	Yield per Acre.														
		J. C. Ruwoldt.			P. H. Niquet.			V. H. C. Kilsby.			A. W. Cobbledelek					
		Large.	Small.	Total.	Large.	Small.	Total.	Large.	Small.	Total.	Total.					
		cwts.	cwts.	cwts.	cwts.	lbs.	cwts.	lbs.	cwts.	lbs.	bags.	bags.	bags.	tons.	cwts.	lbs.
1	2cwts. sup., 1cwt. sulph. potash, 1cwt. nit. soda	12	8	20	20	102	18	56	39	46	12	9	21	3	4	32
2	2cwts. sup., 1cwt. sulph. potash, 1cwt. blood manure	16	8	24	13	36	14	88	28	12	20	9	29	2	9	14
3	2cwts. sup., 1cwt. sulph. of potash	24	12	36	15	24	18	56	33	80	10	7	17	3	0	26
4	2cwts. sup.	24	9	33	15	24	16	72	31	96	13	6	19	3	1	68
5	No manure	30	12	42	11	26	18	54	29	80	14	8	22	2	7	76
6	10 tons farmyard manure	20	8	28	9	58	16	72	26	18	14	10	24	3	11	72

With Mr. Ruwoldt the unmanured plot gave the best returns; with Mr. Niquet a mixture of super., potash, and nitrate of soda gave the best results—being 9cwts. 78lbs. extra yield per acre over the unmanured plot, which yield, at current market rates for potatoes, compensates the grower for the cost of the manures and the expense of applying it. With Mr. Kilsby, on lighter land, the mixture of super., potash, and blood manure gave the best returns, being seven bags per acre more than the unmanured plot, which covered cost of manure and its application. With Mr. Cobbledick 10 tons farmyard manure gave the best results, being 1 ton 4cwts. per acre more than the unmanured plot. Here a considerable profit resulted over and above the cost of application.

A manure test was conducted by Messrs. Pope Bros. at Mount Barker, and the following table summarises the yields:—

VARIETY—SNOWFLAKES.

Plot.	Manure per acre.	Yield per Acre.		
		tons.	cwts.	lbs.
1	2cwts. mineral super., 2cwts. bone super., 1cwt. nitrate of soda, 1 cwt. sulphate of potash	1	17	2
2	2cwts. mineral super.	2	5	2
3	2cwts. mineral super., 2cwts. bone super.	2	5	3
4	No manure	1	5	1
5	10 tons farmyard manure.....	1	14	0
6	10 tons farmyard manure, 1½cwt. mineral super.	1	17	2
7	2cwts. mineral super., 2cwts. bonedust, 1cwt. sulphate of potash	3	5	1
8	2cwts. mineral super., 2cwts. bonedust, 1cwt. nitrate of soda	2	17	2

It will be noted that a dressing of 2cwts. super., costing about 9s. per acre, gave an extra yield of 1 ton per acre over the unmanured plot. Assuming £4 as the market value of the produce, this means a profit of about £3 11s. per acre. Plot 1 gave promise of a very good yield until the heavy March rains, when, owing to its lower situation than the other plots, it suffered very severely from excessive moisture. So far as plots 7 and 8 are concerned, these were sown on land which carried a crop of pease the previous season.

Both plots may, therefore, be considered to have gained considerable stores of atmospheric nitrogen from the action of the symbiotic bacteria on the roots of the pease. Plot 7 received super. and bonedust and potash; plot 8, super., bonedust, and nitrate of soda. The addition of the potash has evidently led to a slight increase in the yield.

TURKEY-REARING.

Having decided upon the variety of turkeys to keep, the next point is to select the breeding stock. "Breed only from the best" is a rule peculiarly applicable to turkeys, they being wonderfully susceptible to surroundings and influences; anything in the way of poor food, neglect, uncleanness, in-breeding, stale ground, will hinder their growth, and at the same time weaken their constitutions.

Breeding only from the best and most perfect specimens is the only sure way to improve the size and stamina of turkeys—a rule, I fear, which has been greatly neglected, several farmers preferring to sell their earliest and best birds at Christmas for the sake of a little extra price, and often relying on young and immature birds for stock—a custom which invariably ends in failure; and, as a consequence, turkeys have been condemned as being "difficult to rear," &c., when the fault has been the breeder's.

Turkeys will not thrive in confinement; an extensive range is necessary for their welfare. A dry gravelly soil is considered best for turkeys, but from experience I have found not absolutely necessary, a matter of much greater importance being fresh ground.

Turkeys should have a house to roost in apart from other poultry, free from draughts, but with plenty of ventilation. Their natural roosting-places being on the branches of trees, therefore warmth is not required; in fact, it is very detrimental to their health, causing them to easier take cold. A house made draught-proof on three sides may with advantage be covered with wire netting on the south side, thus preventing any overheating. Their perches should be at least 3in. broad, with no sharp edges (a larch or other pole sawn in half makes an ideal perch). Stock turkeys should not be kept too fat, or soft-shelled eggs will be the result; they will almost get sufficient with the run of a farmyard. If any food is required, nothing is better than oats, with free access, if possible, to turnips or mangolds, of the latter of which they are very fond. They are naturally good foragers, and this habit should be encouraged in order to keep them in healthy store condition only.

From five to ten hens are sufficient to mate with one gobbler, and to obtain the best results I should advise pullets in their first year being mated with a gobbler of his second year, and hens of over one year with a vigorous young cockerel. Pullets of the first year will generally lay a week, or even more, earlier than hens, and also lay a few more eggs before becoming broody; but the chicks from adult hens are stronger and easier to rear. Turkey cocks arrive at maturity after the moult in their third year, after which they are

not to be relied upon as stock birds. Turkey hens have been known to lay well for several years, and I strongly advise the keeping of a good hen, when proved satisfactory, as long as she continues profitable, mating her with a young and vigorous gobbler.

I do not recommend a large and, consequently, heavy gobbler being starved to reduce his weight, a much better plan being to keep him in a separate run, letting him out at intervals, care being taken no harm is done to the hens.

The turkey hen generally prefers choosing her own nesting-place, but every inducement should be given her to lay where desired by preparing suitable places for her, and where she lays her first egg you can rely on finding the succeeding ones with great regularity.

The hen turkey generally lays from 15 to 20 eggs before becoming broody. It is, therefore, advisable to put about seven of her eggs under a reliable broody hen, when the turkey herself will be able to hatch the remainder, 13 to 15 eggs being a nice sitting for her. The nest should be in a quiet secluded place, where she will not be disturbed, and preferably made upon the ground. Both hens and turkeys are most liable to become covered with lice during incubation. Every effort should be made to destroy and prevent them. If set in a box it should be well limewashed, and the hens should be dusted with insect powder. A dust bath of good dry ashes, well sprinkled with sulphur, should be provided. The severest war must be waged against the insect pests, as they cause greater mortality amongst the young chicks than all other causes combined. The hen should be fed once a day during incubation, maize, wheat, or barley being suitable, with plenty of grit. A few minutes' exercise in a grass plot is also necessary, failing which greenstuff must be supplied.

The turkey hen, being of a shy disposition, should be interfered with as little as possible, and only by her regular attendant, or she becomes fidgety and may break her eggs. As a rule she is an excellent sitter; in fact, is apt to even starve herself by her persistent sitting, so must be carefully watched to prevent it. In very dry weather it is necessary to damp the surroundings of her nest with a little water. If the hen has set well, the chicks will begin to break the shells on the twenty-eighth day, when the attendant must watch the nest and remove all empty shells; but if the mother is quiet and docile the chicks are best left with her until they are a day old.

All the eggs being hatched, and chicks fully a day old, the hen and brood may be put into a large coop outdoors if the day be fine and warm, the mother being well fed, care being taken that the bottom of the coop is both dry and clean, dry ashes, peat moss, cut chaff, or sawdust being supplied, there being no risk of the chicks becoming entangled in these. Their first food may now be given, consisting of hard-boiled egg, chopped up very fine and mixed with bread crumbs, only giving them a very small quantity and preferably upon a little feeding board, which can be taken away immediately they have fed,

thus preventing any turning sour. The first few days they should be fed every two hours, adding a little green meat finely cut up, dandelion, lettuce, chickweed, or clovers answering admirably. When a few days old a custard can be made by beating the eggs and boiling in a little new milk until stiff. If too moist mix a little grated biscuit to attain the desired consistency.

As the chicks get older biscuit-meal can be substituted alternately with the custard, and occasionally maize-meal, cooked to a crumbly mass. At all times, from the first few days, an abundance of green food must be supplied, which must be freshly gathered and cut up fine. Onions may be given occasionally, but, as they have a tendency to cause diarrhœa, must be used sparingly; still, as a change, are desirable. During the first few weeks of their existence they require constant attention, their food varying as much as possible, never going with the same kind twice together, their coops and feeding-boards kept scrupulously clean. They must be kept dry and warm, a sudden shower often killing several.—From the *Feathered World*.



CONCRETE FENCING POSTS.

Messrs. H. M. Bainer and H. B. Bonebright, Experts in Farm Mechanics, Colorado Agricultural College, U.S.A., have recently described what they consider the best method of making concrete fencing posts. In their preliminary remarks they give the cost of untreated wooden posts in America as 5d. to 7½d. each, and of treated posts as 10d. to 1s. 3d. In emphasizing the growing need for concrete posts they say the cost of the perishable wooden fencing post is almost double what it was a quarter of a century ago, and in another quarter of a century there is no doubt but that its cost will be double that of the present.

MATERIALS TO USE.

In cement post construction it is desirable that the posts be made as light and as strong as possible, and thus it is practical to use nothing but the best grade of Portland cement.

Sand.—Clean, sharp sand with grains varying in size from small to large makes the best mixture. By clean sand is meant that which is free from

clay, loam, or foreign materials. These tend to retard the proper setting of the cement and destroy its adhesive quality. In many sections mica is found mixed with sand in large enough quantity to seriously interfere with the strength of a mixture made from it. Sharp sand is composed of sharp, angular grains of all sizes, and makes better mixture than that which is smooth and round, or "river worn." A sand composed of fine and coarse grains mixed is to be preferred, because less cement will be required to fill the voids than either used by itself. Leaves, sticks, stones, or gravel should be removed by screening.

Gravel.—The same general rules used in the selection of a good grade of sand will apply to gravel. It should be composed of clean, sharp pebbles of all sizes. For post construction the pebbles must not be too large, as they will interfere with the proper placement of reinforcement.

Broken Stone.—Broken stone used for post construction must contain no large pieces, as they will interfere with the placement of the reinforcement. It is necessary to use some sand with the stone to fill voids and thus save cement. It is not desirable to use soft sandstone, soft limestone, slates, or shale. Granite, hard limestones, and coarse gravel which has been crushed is considered best.

Water.—The water used in making a cement or concrete mixture should be clean and free from alkali. Satisfactory experiments have not been conducted to show the effects of alkali water used in making a mixture of this kind, but enough is known as to its effect on cured cement constructions to justify not using it in the mixture.

PROPORTIONS.

On account of a difference in the total open space or voids in sands or gravel composed of different sized particles, and also that more cement is required in some conditions than in others, it is often necessary to make a rough determination of the percentage of voids to the total aggregate. Where maximum strength is required about 10 per cent. more cement should be used than the total voids.

The determination may be made as follows: Secure a watertight box or pail of known capacity, fill it with the aggregate to be used so that when it has been well shaken it will smooth off even at the top. Pour water of known amount into this until full. The volume of water used in proportion to the total volume of the receptacle determines the total voids.

For example, suppose the total volume of the receptacle in which the aggregate is placed is 2,032 cub. in., and that it takes 2galls. of water to fill it. One gallon of water contains 231 cub. in., and 2galls. would contain 462 cub. in. The total volume of water used divided by the volume of the receptacle holding the aggregate represents the proportion of voids. Thus, 462 divided by 2,032 equals 22.73; or the voids make up 22.73 per

cent. of the total volume. For the maximum strength 10 per cent. should be added to this. Ten per cent. of 22.73 equals 2.27. By adding this 2.27 to 22.73 we obtain 25, or, in other words, 25 per cent. of the total volume should be cement. The mixture in this case would be represented by one part of cement to four parts of aggregate.

The proportions used in the constructions of the fence posts in this article varied from one part cement and three parts of sand to one part of cement and five parts of sand. In others gravel was used in the proportion of one part cement, three parts sand, and three parts gravel. It is a difficult matter to use broken stone or gravel in large quantity and place the reinforcement properly.

Measure all materials in correct proportions. This may be done with a shovel, a pail, wheelbarrow, or barrel. It will usually be advantageous to measure the water, especially where small quantities are mixed or where the same amount of mixture is made several times.

MIXING.

Hand Mixing.—Where the mixing is done by hand a flat, watertight platform or shallow box is convenient. Measure the sand and place it in a uniform layer, and over this spread the proper amount of cement. Mix this thoroughly before adding water until it shows a uniform color. The rule is to shovel it over at least three times. Now spread out the mixture, making a sort of basin in the middle into which the greater part of the water may be poured. Work in the dry edges until the water disappears; then add enough more water in small amounts to make the mixture of the desired consistency. Do not mix more material than can be used in 20 min.

Machine Mixing.—It is usually customary to use mixing machines on large jobs. It is not only economical, but does better work. Where power is available it is often advantageous and economical to construct a mixer for small jobs also.



THE CHEMISTRY OF HONEY.

By T. E. WHITELAW, Inspector under the Foul Brood in Bees Act.

It is essential that the general public, together with the beekeepers, should have a thorough knowledge of the composition of honey so that correct judgment can be passed on its value as an article of food possessing valuable medicinal properties.

The advent of cheap sugars has caused honey to lose its premier position as a necessary article of diet, for in ancient times it was the principal substance used for sweetening purposes. The reason for this is not the superior qualities of these sugars, but chiefly because they are cheaper and better adapted for domestic purposes. Neither is it attributable to honey having lost any valuable principles, for the tendency has been, with the improved methods of modern bee-keeping, to place it on the market in a more wholesome and cleaner condition than in former years.

Honey is a carbohydrate, or, in other words, is matter composed of the three elements, carbon, hydrogen, and oxygen; and it is interesting to trace its formation in nectar-producing plants. Plants absorb from the atmosphere, by the assistance of their leaves, carbon dioxide, and after a chemical process return to the air the oxygen of the compound, retaining for their own use the carbon. The natural moisture of the plant combines with this carbon, and starch is the result. This is then reduced by the action of the diastase contained in the plant juices to a sweet sticky solution, composed mainly of sugar and one or two undissolved substances, one of them being a gum called dextrine. One atom of sugar is absorbed by each plant cell and deposited as cellulose, or woody fibre.

Another portion of the dissolved starch changes to cane-sugar, which serves to supply the nectaries of the blossoms with the sweet fluid that attracts those fertilising insects so necessary for perfect pollination. This cane-sugar nectar, which often contains 80 per cent. of water, is abstracted by the visiting bee and passes into its honey sac, where it undergoes a complete transformation. A certain proportion of water is then eliminated, and the action of a secretion derived from a gland converts the cane-sugar to honey, which is a combination of two glucose sugars—dextrose and levulose. The remaining surplus water contained in the honey, which renders it liable to fermentation, is evaporated in the high temperature of the hive prior to it being sealed up in the comb cells.

Many people are surprised to learn that honey is a glucose, for they naturally confuse the term with commercial "glucose"—the article so much in use at the present day for the purposes of brewing and the adulteration of food. Commercial glucose is a form of dextrose manufactured on a large scale by boiling the starch of corn or maize with dilute acids, usually sulphuric or tartaric, which invert it to an imitation glucose sugar. By filtration through chalk the acid is partially removed, but as a small quantity invariably remains in the finished product, it has a harmful effect if used in connection with food for human consumption.

The natural glucose sugars of honey—dextrose and levulose—are generally found in almost equal quantities, together with a certain amount of water, which varies from 25 per cent. to 15 per cent. in a ripe well-bodied honey. When the percentage falls below 20 per cent., as it usually does with the honeys produced in this State, they are very dense and candy readily, a larger proportion preventing quick granulation.

It is natural for all pure honeys to granulate, dividing in the first instance into two portions, one crystalline and the other liquid—being dextrose and levulose respectively. The water in the honey is not sufficient to hold the dextrose—which easily crystallises—permanently in solution, and it granulates, being held in suspense by the levulose. The dextrose gradually overcomes the levulose and the latter crystallises, the honey becoming drier and more solid. Candied honey stored for a long period becomes very dry and powdery, each grain showing prominently. Agitation and the fluctuations of temperatures assist granulation.

The fact that newly-gathered honey contains a large amount of water renders it essential that it must be properly ripened and evaporated in its natural environment, the hive, so as to attain the finest quality and flavor. Honey has been subjected to various tests which point to one important conclusion—that honey possesses a certain humidity point above which it will absorb moisture from the atmosphere, and below which it will give off moisture to the air. The importance of this to bee-keepers must not be neglected, for should it be necessary to store honey for any length of time these facts show us that honey must be preserved in air-tight receptacles in a warm dry atmosphere. Honey insufficiently or artificially ripened will never possess the same value, for the simple reason that it does not attain the perfect flavor of a naturally ripened honey, and the flavor it does possess is liable to deteriorate in time. Thin honey is always liable to ferment, and should it require heating for the purpose of tinning off, it darkens and acquires an inferior flavor far more readily and at a lower temperature than those honeys that have been allowed to fully mature.

The bee carries from the blossoms other valuable constituents which are of considerable importance with regard to the flavor and color of the

resulting honey. The essential oils are obtained in this manner, and give to it an inimitable variety of flavors and aromatic principles.

A small amount of formic acid can usually be separated from honey, and it is generally assumed that, owing to its antiseptic nature, it acts to a certain extent as a preservative. Indeed, it is claimed by some persons that honey is a cure for rheumatism on account of the presence of this acid. Exactly how formic acid finds its way into the honey is not known, for the statement sometimes made that the bees visit each honey-cell and deposit a minute drop of acid from the acid gland attached to their stings, is one that can hardly be substantiated.

Grains of pollen, the fertilising dust of flowers, find their way into honey, and by examining their structure and numbers with the aid of a microscope and comparing them with those found on various blossoms, the source from which the honey was derived may be determined. When honey is heated beyond a temperature of 170° F. the grains become overheated and split, so that the nitrogenous contents are expelled into the honey, causing it to acquire a characteristic flavor.

The food value of honey depends on its sugars. Cane sugar, before it can be assimilated by human beings, has to be inverted to glucose sugar by the action of the salivary glands, as it would otherwise have a harmful effect. The fact that honey is already in this state places it in the category of a pre-digested food. It is ready to be absorbed immediately into the system, strengthening and purifying the blood, and is especially good for anæmic people. Solomon recommends its use in the words, "Eat thou honey, my son, for it is good."



A CAMEL TEAM IN THE INTERIOR.

STALLION PARADES.

The following programme of stallion parades, at which horses will be examined for the Government certificate of soundness, has been arranged by the Chief Inspector of Stock (Mr. R. J. Needham) :—

Date.	District.	Place.	Time.
JULY.			
Thursday, 14.....	South-East	Swan Reach	10 a.m.
" 28.....	Northern	Quorn	10 a.m.
AUGUST.			
Wednesday, 3.....	Yorke's Peninsula ...	Yorketown	4 p.m.
" 3.....	Balaklava	Balaklava	12 noon
Friday, 5.....	Northern	Laura	11 a.m.
" 5.....	"	Jamestown	11 a.m.
Tuesday, 9.....	"	Saddleworth	10-30 a.m.
Wednesday, 10.....	Yorke's Peninsula ...	Minlaton	10 a.m.
Friday, 13.....	Murray River	Mannum	10 a.m.
Tuesday, 16.....	Central	Snowtown	10 a.m.
Wednesday, 17.....	Northern	Bute	10 a.m.
Thursday, 18.....	Eastern	Strathalbyn	10-30 a.m.
Friday, 19.....	Northern	Burra	10 a.m.
Saturday, 20.....	South-East	Bordertown	2 p.m.
Wednesday, 24.....	Central	Gawler	11 a.m.
Friday, 26.....	South-East	Naracoorte	10 a.m.
SEPTEMBER.			
Friday, 2.....	South-East	Penola	10 a.m.
Saturday, 3.....	"	Mount Gambier ...	10 a.m.
Wednesday, 7.....	Central	Kapunda	9 a.m.
Tuesday, 13.....	Metropolitan	Adelaide	9 a.m.
Wednesday, 14.....	"	"	9 a.m.
Tuesday, 20.....	South-East	Kingston	10 a.m.
Wednesday, 28.....	Central	Eudunda	9 a.m.
OCTOBER.			
Wednesday, 5.....	Northern	Orroroo	9 a.m.
Thursday, 6.....	Central	Two Wells	10 a.m.
" 13.....	Port Lincoln	Lipson	10 a.m.
Tuesday, 18.....	Central	Clare	10 a.m.
Wednesday, 19.....	"	"	10 a.m.
" 19.....	Yorke's Peninsula ...	Maitland	10 a.m.
Thursday, 27.....	Southern	Willunga	10 a.m.
Friday, 28.....	"	Normanville	9 a.m.

Mr. Needham has received a report from Mr. McEachran respecting the parade at Balaklava, in which it is stated that the parade was most successful. In all 35 stallions were paraded, including six with life certificates. Twenty-five stallions were presented for examination, and 21 of them succeeded in gaining the Government certificate of soundness.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, July 13th, there being present Messrs. J. W. Sandford, W. J. Colebatch, M.R.C.V.S., C. J. Valentine, R. J. Needham, J. Miller, C. Willcox, W. Gillard, and Col. Rowell.

The Secretary reported that the Hon. Minister had reappointed Messrs. J. W. Sandford, G. R. Laffer, C. Willcox, C. J. Valentine, J. Miller, and C. J. Tuckwell as members of the Board. The request of the South-Eastern Conference for representation on the Board would be dealt with at a later date.

Messrs. J. W. Sandford and A. M. Dawkins were appointed Chairman and Vice-Chairman for ensuing year.

The Hon. Minister forwarded the following report by the Dairy Expert on the question of the manufacture of butter from heated cream :—" I am satisfied that creams of high temperature can be successfully treated to produce a butter not carrying more than 16 per cent. To secure such results, I would recommend that the factories should lower the temperature of the cream which is received in the heated condition to, say, 46° to 50° immediately, by running the cream over the cooler. When churning, care should be taken not to place too much cream in the churn at one time, and to see that the temperature of the wash water does not vary more than, say, 2° Fahr. from the temperature of the cream under treatment. Churning having been accomplished in a proper manner, the rice-sized granules of butter should be allowed to stand for about 15 minutes, when much of the free moisture will drain away. The butter should then receive sufficient working to remove any remaining free moisture, when the salt may be added, together with the preservative. In each case I would not recommend more than 3½ per cent. of the former and ¼ per cent. to ½ per cent. of the latter. Same should be well mixed and every care taken to see that the mixture is evenly distributed throughout the mass of butter, which can only be accomplished by a thorough working. Should the maker have any doubt as to the water content going safely within the limit allowed in England, he may, by simple analysis, determine the percentage of water contained. In such a case, I should recommend him strongly to give the butter another light working just before packing for export. I would further point out that where brine salting is practised the water contained would be found to exceed that of dry salting by about 1 per cent. Again, where manufacturers use excessively cold water and ice to reduce the temperature of the cream hurriedly by direct

contact they will find that such a practice is also conducive to high water percentage in the butter. Factors which influence water content are practically under the control of the manufacturer, viz., temperature, quantity of cream in churn, temperature of the wash water, and amount of working given to the butter. It must be admitted that during the hot spells of summer our farmers have great difficulty in delivering cream to factories at a temperature which is calculated to give best results as regards quality; but improved conditions could obtain were many of them to give more attention to their creams during the time it is at the farms and transit to the railway station or factory. Much cream is lowered in value on account of the exposed condition it is subject to while awaiting trucking on the railway station. It is a great pity that the consideration due to this particular matter is not fully recognised by the powers that be, and until such occurs the quality of our butters must make for little progress. For the information of the Board I might add that of a considerable number of analyses made by me I have found only two samples to show more than 16 per cent., and these were not submitted for export. The minimum water content found was 9.10 per cent., and the highest 15.95 per cent. It is, however, to be regretted that during the last few years there appears to be a growing tendency throughout Australia to make for higher water content in the butters forwarded to oversea markets."

Mr. Suter added—"Although it would be difficult to always secure the manufacture of a butter containing not more than 14 per cent. moisture from heated cream, still under proper conditions of manufacture it can generally be accomplished."

Approval was given to the formation of a Branch of the Agricultural Bureau at Elbow Hill, with the following gentlemen as members:—Messrs. W. T. Cooper, F. Tilley, G. C. Dunn, G. F. Wake, J. A. Williams, R. W. Bunn, R. S. Mills, A. O. Chishnan, M. P. Bainkie, W. G. Haines, W. S. Tilley, A. J. Tilley, J. B. E. Wake, J. Behn, A. M. Styles, J. Ward, J. Harvey, S. V. Wake, H. W. Wheeler, E. R. Wake, T. Storey, W. Storey, A. W. Bryant.

The following gentlemen were approved as members of the undermentioned Branches:—Messrs. T. N. Entwistle, Port Pirie; E. E. Collins and A. Haines, Orroroo; C. H. Koch, J. Harvey, J. A. Leske, E. A. Elliot, Freeling; C. G. Marshall, O. Westree, A. Scown, W. Burzacott, Tatiara; C. E. Hammond, W. Bastain, Parrakie; H. A. Wohler, B. Malcolm, W. E. Rodgers, W. Munro, sen., Naracoorte; W. Eastwood, W. J. Kimber, Northfield; F. East, Mallala; E. Green, R. Collins, F. Rowley, Forest Range; G. Ricks, J. Brumby, J. Mildwater, Cherry Gardens; F. J. Johnson, T. Nottle, A. Sanderson, H. Scholtz, Cummins; C. Schulze, T. Sorrell, jun., W. Spencer, T. A. Phillips, W. Neville, J. O'Shea, J. Dunn, Wilkawatt; C. C. Spencer, Clarendon; E. J. Crosby, Arthurton; E. W. Hawker, H. Mayor, F. Pink, B. Lloyd, W. Patullo, Clare; W. T. Matthews, Bute; P. Sinclair, R. Bond, Utera Plains; H. V. Cornish, Gumeracha; H. A. Kleeman, W. H. Russell,

A. Ellis, Meadows ; J. Honan, Mount Bryian East ; M. M. Checker, W. R. Burt, A. Bruce, Waikerie ; A. C. Petrie, Beetaloo Valley ; L. R. Christie, Morphett Vale ; E. W. Duffield, Kybybolite ; R. Quinn, Belalie North ; A. Clark, Angaston ; S. Giles, Mount Remarkable ; T. W. Morton, J. W. Marshall, C. R. Marshall, W. F. Ortloff, T. R. Luke, R. A. Hancock, Moonta ; T. Parks, E. Story, Miltalie ; R. P. Uphill, Nantawarra ; D. Rabbit, Lucindale ; W. Pannell, C. A. Paige, E. Blatchford, J. Lang, Geranium ; G. Roberts, Petina ; J. Hackett, W. H. Stock, Port Germein ; B. J. Litchfield, W. Hill, Wilmington ; G. Roocke, Wepowie ; W. H. Curtis, Uraidla and Summertown ; A. J. Hughes, S. M. Bawden, J. W. M. Cowley, J. Charlton, W. Bray, Butler ; G. Hollett, Wirrabara ; E. J. Nestor, Davenport ; E. J. Knucky, H. A. Spoehr, J. Lawrence, H. Lawrence, H. Lawrence, jun., A. D. Johnston, Woodside ; T. Hayes, Penong ; J. James, Salisbury.

The Mitchell Branch wrote asking approval to Conference of Eyre Peninsula Branches about the end of October. Cummins was suggested as the most convenient centre. It was decided that the Board support the proposal for a conference in the most convenient centre, but could not say yet how many members would be able to attend.

Mr. Colebatch referred to the question of veterinary education in this State, and suggested that the Government be asked to offer two scholarships annually, tenable at the Melbourne University, where a Veterinary College had been established. Members thought favorably of the general principles of the scheme, and a committee consisting of Messrs. R. J. Needham, C. J. Valentine, and A. M. Dawkins was appointed to confer with Mr. Colebatch and report to next meeting.

Mr. Colebatch reported having selected a field at Roseworthy for the demonstration of Messrs. Forgan's stonegatherer on Farmers' Day at the College.

Mr. Miller said he had been much struck with the marked difference in the growth of different varieties of lucerne on the Murray Bridge Experimental Block. He noticed that in Victoria they were growing lucerne without irrigation, and he moved "That the Hon. Minister of Agriculture be asked to obtain from Mr. McIntosh a report on the possibility of growing lucerne profitably on suitable soils in this State without irrigation ; to indicate the nature of soils, system of cultivation, and varieties of luccerne suitable for the purpose ; and also that the Minister be asked to arrange for a few experimental plots in different localities." Mr. Colebatch, in seconding the motion, mentioned that lucerne sown in the crops at Roseworthy during the past two or three years had done well. The motion was carried.

WORK OF THE CHEMICAL LABORATORY.

The following summary of a work by B. Welbel on investigations made during 1908 on the influence of manures and fertilisers, as well as green manure, upon the fertility of the soil, is published in the *Experiment Station Record* of the United States Department of Agriculture:—

"Influence of Fertilisers and Manure.—In view of the fact that previous experiments had shown that the application of manure on fallow in a four-year rotation sensibly and profitably increased the yield of the following crops, and that the manuring increased the proportion of nitrates in the soil as well as the amount of nitrogen assimilated by the crops, further experiments were undertaken to study the relation of the manuring to the assimilable phosphoric acid of the soil. In pot experiments it was found that the yields were better in a rotation with manure than in one without manure, but that the effect of the manure disappeared after three years. The manuring increased both the assimilable nitrogen and the assimilable phosphoric acid. In three years about 65 per cent. of the nitrogen and nearly all of the phosphoric acid applied in the fertilisers were assimilated. The addition of manure ashes favored nitrification and furnished a good source of assimilable phosphoric acid. The use of sterilised manure reduced nitrification, and such manure was but slightly superior to manure ashes as a source of assimilable phosphoric acid. The nitrogen of the manure was assimilated to a much less extent than the phosphoric acid.

"The results indicate that manure exerts a beneficial effect through its mineral constituents and biological properties, but an unfavorable effect, particularly on nitrification, through its dead organic constituents. The results of the pot experiments were confirmed in the main by those of field experiments, and the general conclusion is drawn that the effect of manure in increasing yields is due to the presence of nitrogen and phosphoric acid, which is readily assimilated by plants. The assimilability of these constituents depends not only upon the individual characteristics of the plant grown, but also upon conditions favoring the activity of the micro-organisms of the manure. These conditions are best realised in fallow and to the least extent in spring wheat soil.

"The Influence of Green Manures.—An examination of soils on which various leguminous and non-leguminous plants had grown showed much less nitrogen in the soil after the growth of cereals than after fallow or the culture of leguminous plants. On the other hand, the soil on which leguminous plants had been grown contained much less phosphoric acid than the grain soil. Among the leguminous plants the best results as regards phosphoric acid were obtained with esparcet (sainfoin) and the poorest with clover, which left the soil with a smaller amount of phosphoric acid and nitrogen. Fallowing increased to a considerable extent the proportion of assimilable phosphoric acid and potash in the soil."

THE WHEAT MARKET.

The wheat market in all the States for the month of July was entirely dependent upon London, where prices fluctuated in sympathy with the reports respecting the condition of the crops in the big wheat-producing countries—especially the United States and Canada. On the whole, the price improved steadily and gradually throughout the month, and was affected chiefly by the persistent reports respecting a probable shortage in North America and Russia. Some alarming reports were circulated as to the actual damage done, particularly in North Dakota, which has the largest acreage of the important spring wheat States. Seeing, however, that there is a much larger area under spring wheat in the United States and Canada this year as compared with last, the total production is not likely to be very much lessened, and should there be a shortage it will probably be more than counterbalanced by the increased yields in India, Hungary, and Roumania.

Beerbohm's Evening Corn Trade List of July 1st estimates the probable outturn of the year's crops, and it writes respecting the total figures as follows:—"Summarising the various estimates for all the European crops, we arrive at a total of 250,000,000qrs., which would compare as follows with the last five years:—

EUROPEAN WHEAT CROP.

	Qrs.		Qrs.
1910	250,000,000	1907	213,000,000
1909	251,000,000	1906	231,500,000
1908	219,000,000	1905	232,500,000

"In regard to the United States and Canada, it is too early to give any definite estimate of the spring wheat crop, but in the winter wheat States the harvest is proceeding rapidly, and so far all reports received regarding threshing results are more favorable than had been expected; it is quite possible that the yield of winter wheat will be very little short of 1909, when it amounted to 55,000,000qrs. The yield of spring wheat last year was 36,000,000qrs., of which North Dakota—where the crop has suffered so much from drought—produced 11,300,000qrs. The area sown to spring wheat is 1,350,000 acres larger than last year, and in ordinary years this would yield over 2,000,000qrs. If the yield from the increased acreage be put against the shortage in South Dakota and Minnesota, where the crop so far has only suffered to a moderate extent, and allowing only half last year's yield for North Dakota, the total outturn would be about 6,000,000qrs. less than last year. In Canada the area this year is 19 per cent. larger than in 1909, and this ought to go a long way towards making up for the damage caused by the drought, provided weather conditions are favorable in the future. Against the shortage in the United States and Canada has to be placed the large increase of 9,000,000qrs. from the Indian crop.

"Altogether, present indications are for a total world's crop very little smaller than the record crop of last year; and taking into account the very much larger quantity of old wheat, both in exporting and importing countries, which will be carried forward this year into the new season, there appears every prospect of ample supplies being available for all requirements at a very moderate level of prices."

Broomhall's Corn Trade News of June 28th comments on the wheat position as follows:—

"The general indications at the moment, saying that the damage in North America does not develop much further, we think, point to moderate fluctuations around present prices. The comparative abundance of farmers' reserves of old wheat in many countries is bound to have some influence in keeping the speculative sentiment within bounds; but, as we pointed out last week, the absence of overwhelming supplies in commercial channels, such as conduced to the great price depression of the middle nineties, together with sound financial conditions and cheap money, should prove sufficient to prevent any serious slump. Meanwhile the last stage of the development of the crops of North-Western Europe and their successful harvesting will be watched with vigilance."

Date.		LONDON (Previous Day).		ADELAIDE.		MELBOURNE.		SYDNEY.	
		Per Bushel.		Per Bushel.		Per Bushel.		Per Bushel.	
July 8	—	..	..	3 3 to 3 3½	..	3 7 ex store	..	3 5½ to 3 6 (b.)	..
9	Unchanged	..	..	3 3 to 3 4	..	..	..	..	..
11	—	..	..	3 4½ to 3 5	..	3 7 to 3 7½ ex store	..	3 6½ (b.) ; 3 7½ (s.)	..
12	4 3 afloat	..	..	3 4 to 3 4½	..	3 7½	..	3 7 (b.)	..
13	Steady ; quiet	..	..	Do. ..	..	3 7½ ex store	..	3 6½ (b.) ; 3 7½ (s.)	..
14	4 4½ June (sailer)	..	..	3 4½ to 3 5	..	3 7½ to 3 8	..	3 7 to 3 7½ (b.) ; 3 8 (s)	..
15	4 5½ off coast ..	..	..	3 5 ..	..	3 9 ..	..	3 8 (b.) ; 3 8½ (s.)	..
16	4 6½ afloat (s.)	..	..	3 6 ..	..	3 10 ..	..	—	..
18	—	..	..	3 6 to 3 7	..	3 10½ to 3 11	..	3 10 (b.)	..
19	4 6 afloat (s.) ..	..	..	3 7 to 3 8	..	3 11 to 3 11½	..	Do.	..
20	4 6½ off coast ..	..	..	Do. ..	..	3 11½ to 4 ..	..	Do.	..
21	4 7½	..	..	3 8 to 3 9½	..	4 0½ to 4 1	..	3 10½ (b.) ; 3 11½ to 4 - (s).	..
22	4 7½ April (sailer) ; 4 7½ (steamer)	..	..	3 8 to 3 9	..	4 1 ex store	..	3 11 to 3 11½ (b.) ; 4 - (s).	..
23	Fum	..	..	3 8½ to 3 9½	..	4 1½ ex store	..	3 11½ (b.)	..
25	—	..	..	3 10 to 3 11	..	4 1 to 4 ..	..	4 - parcs. (b.)	..
26	Queter	..	..	Do. ..	..	3 11½ to 4 ..	..	3 11½	..
27	4 9½ (sailer)	..	..	Do. ..	..	3 11½ to 3 11½	..	3 10½ parcs. (b.)	..
28	4 9 off coast	..	..	3 9 to 3 10	..	3 11 (~) ; 3 10 (b)	..	3 9½ to 3 10 (b.)	..
29	Dull	..	..	3 8 to 3 9½	..	3 10½ to 3 11	..	—	..
30	Dull	..	..	3 8½ to 3 9	..	3 10½ to 3 11	..	—	..
August 1	—	..	..	3 8 to 3 9	..	Do ..	..	3 8½ (b.) ; 3 10 to 3 10½ (s.)	..
2	—	..	..	3 8 to 3 9	..	Do ..	..	—	..
3	Easier	..	..	Do ..	..	3 10½	..	—	..

STEAMER FREIGHTS.—During the latter part of July farmers sold pretty freely, and as a result chartering was fairly brisk. Rates for steamer full cargoes South Australia to United Kingdom-Continent advanced from 21s. 6d. per ton (7d. per bush.) to 24s. 6d. per ton (7½d. per bush.). Steamer tonnage was chartered to lift about 30,000 tons of wheat (full cargoes). For parcels, South Australia to London or Liverpool, 22s. 6d. to 23s. per ton (7½d. to 7d. per bush.) is obtainable. For Adelaide to Melbourne, 8s. a ton (2½d. a bush.) ; to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—For sailing vessels, 23s. 6d. per ton (7½d. per bush.) is obtainable for full cargoes South Australia to United Kingdom or Continent. For South Africa the rate is 19s. per ton (6½d. per bush.). About 100,000 tons was arranged for at these rates.

RAINFALL TABLE.

The following table shows the rainfall for July, 1910, at the undermentioned stations, also the average total rainfall for the first seven months in the year, and the total for the seven months of 1910 and 1909 respectively:—

Station.	For July, 1910.	A'v'ge. To end July.	To end July, 1910.	To end July, 1909.	Station.	For July, 1910.	A'v'ge. To end July.	To end July, 1910.	To end July, 1909.
Adelaide	4.05	12.67	15.74	14.54	Hamley Bridge	2.84	9.67	13.15	10.97
Hawker	1.68	6.85	11.79	10.11	Kapunda....	3.23	11.56	14.61	15.02
Craddock	1.24	6.28	9.95	8.62	Freeling	3.06	10.34	13.58	11.52
Wilson.....	1.88	6.86	12.61	8.93	Stockwell ...	2.49	11.70	13.29	13.42
Gordon.....	1.42	8.72	6.50	8.65	Nuriootpa...	4.28	12.28	15.36	15.04
Quorn.....	2.66	7.69	11.43	10.57	Angaston ...	3.78	12.44	17.12	16.29
Port Augusta.	2.06	5.50	10.91	8.09	Tanunda	4.29	12.84	16.61	16.90
Port Germein	2.03	7.30	12.56	9.44	Lyndoch	3.63	13.43	15.77	15.16
Port Pirie ...	2.53	7.61	16.43	8.46	Mallala	3.09	9.97	13.06	10.63
Crystal Brook	2.77	8.68	13.56	10.65	Roseworthy .	3.17	10.22	14.23	12.08
Pt. Broughton	2.60	8.48	12.77	9.07	Gawler.....	2.87	11.42	14.78	14.21
Bute	3.59	9.16	15.89	8.45	Smithfield ..	3.09	9.93	15.07	11.57
Hammond ..	1.58	6.18	10.28	9.88	Two Wells...	2.90	10.31	12.56	9.25
Bruce	1.42	5.17	10.57	7.52	Virginia.....	4.32	10.58	15.08	11.69
Wilmington ..	2.63	10.20	16.14	14.24	Salisbury	3.06	11.13	16.47	11.95
Melrose	4.22	13.62	21.87	20.53	Teatree Gully	4.56	17.00	19.29	22.45
Booleroo Cntr	2.52	8.92	13.26	11.72	Magill	4.71	15.69	16.41	21.07
Wirrabara...	3.13	10.87	16.57	16.86	Mitcham	3.93	14.66	15.13	17.36
Appila	2.55	8.35	16.21	10.49	Crafers.....	8.40	27.69	32.85	40.14
Laura	3.15	9.96	17.79	15.68	Clarendon	5.93	20.47	20.18	25.75
Caltowie	2.25	9.47	13.08	10.86	Morphett Vale	4.42	14.26	15.75	17.52
Jamestown ..	3.24	9.47	13.58	11.40	Noarlunga...	4.64	12.40	14.69	15.38
Gladstone ..	2.60	8.76	11.28	9.85	Willunga.....	5.37	15.79	19.31	21.11
Georgetown ..	2.86	10.50	13.44	11.10	Aldinga.....	5.06	12.53	15.75	15.98
Narridy	2.57	9.64	12.58	9.23	Normanville..	6.43	12.84	17.91	15.24
Redhill	3.66	9.56	17.54	11.41	Yankalilla...	7.89	14.15	25.35	14.66
Koolunga ...	3.65	9.00	16.46	10.39	Eudunda	6.28	9.58	20.93	7.77
Carrieton...	1.60	6.63	13.36	10.20	Suthorlands .	1.87	5.44	10.83	6.15
Eurelia	1.80	7.18	12.36	9.51	Truro.....	3.85	11.06	15.87	14.36
Johnsburg ..	1.13	5.26	10.20	8.41	Palmer	3.13	—	13.35	9.67
Orroroo	2.18	7.84	11.34	10.21	Mt. Pleasant.	5.24	16.07	18.35	17.79
Black Rock ..	2.08	6.83	11.82	10.36	Blumberg ...	5.59	17.83	19.38	19.87
Petersburg ..	2.02	7.12	10.33	8.71	Gumeracha....	6.33	19.57	21.85	26.78
Yongala	2.00	7.44	10.29	8.99	Lobethal....	6.59	21.27	22.63	27.67
Terowie	1.82	7.28	13.22	8.48	Woodside ...	5.89	18.44	23.26	24.50
Yarcowie.....	2.01	7.62	13.07	9.25	Hahndorf	6.16	20.68	35.16	24.61
Hallett	2.31	9.10	11.12	8.93	Nairne.....	5.16	16.95	22.15	22.56
Mount Bryan	3.34	8.91	13.22	8.80	Mt. Barker ...	5.04	18.21	21.72	23.00
Burra	3.44	10.23	15.53	11.86	Echunga	4.65	19.39	24.66	27.83
Snowtown...	3.19	9.13	14.09	10.35	Macclesfield..	5.81	17.59	23.99	24.51
Brinkworth...	3.50	8.52	14.97	9.37	Meadows.....	6.33	20.86	27.24	27.99
Blyth.....	3.42	9.48	12.85	12.00	Strathalbyn ..	4.07	11.27	16.36	15.37
Claro	5.43	4.22	20.43	16.72	Callington...	2.69	9.32	12.30	10.03
Mintaro Cntrl.	4.02	12.49	16.83	14.90	Langhorne's B	3.01	8.95	17.32	10.24
Watervale....	5.54	15.83	18.77	18.28	Milang.....	2.74	10.31	9.71	10.46
Auburn	6.66	14.07	20.52	20.15	Walleroo.....	2.78	8.65	12.69	9.07
Manoora	2.95	10.07	13.89	11.24	Kadina	2.76	9.94	12.51	10.78
Hoyleton.....	3.16	10.74	11.60	10.36	Moonta	2.68	9.62	10.52	11.39
Balaklava ..	3.12	9.43	13.10	9.67	Green's Plns .	2.98	9.52	12.24	10.82
Pt. Wakefield	2.69	8.15	10.65	6.84	Maitland	5.11	12.41	13.25	13.23
Saddleworth	3.69	11.70	14.75	12.16	Ardrossan ..	2.90	8.43	10.02	8.34
Marrabel ...	3.45	10.91	14.30	14.90	Port Victoria	3.07	9.50	10.77	8.71
Riverton.....	4.12	11.86	18.09	15.04	Curramulka ..	2.71	11.42	13.13	12.03
Tarlee	3.20	10.04	14.16	12.68	Minlaton.....	2.88	10.70	13.17	10.84
Stockport ...	2.49	9.39	10.73	10.26	Stansbury...	3.98	10.28	13.40	11.92

RAINFALL TABLE *continued.*

Station.	For July, 1910.	A'v'ge to end July.	To end July, 1910.	To end July, 1909.	Station.	For July, 1910.	A'v'ge to end July.	To end July, 1910.	To end July, 1909.
Warooka....	4 22	10.98	14.26	9.94	Bordertown .	2.56	11.26	12.12	12.94
Yorke town .	3.93	10.70	13.70	9.99	Wolsley....	3.19	9.89	12.98	12.55
Edithburgh..	3.68	10.15	14.67	10.06	Francesa.....	3.74	11.14	13.75	12.07
Fowler's Bay.	3.26	8.30	7.35	6.99	Naracoorte .	3 57	12.80	15.55	15.79
Streaky Bay.	5.23	9 98	11.87	11.17	Lucindale ...	3.89	13.47	18.61	17.27
Port Elliston.	7.07	10.56	13.33	10.96	Penola	4.40	15 25	19 90	17.61
Port Lincoln.	6.94	12.44	14.87	12.11	Millicent	7.69	17.74	22.46	25.51
Oswell	1.49	7.00	8.82	4.84	Mt. Gambier.	8 91	18.34	25 03	26.34
Queenscliffe .	9.45	11.61	25 72	12.03	Wellington ..	1.83	8 80	12.19	10.91
Port Elliot ..	4.53	12.53	14.29	10.83	Murray Bridge	2.78	8.27	15.08	10.94
Goolwa	4.54	10.76	14.55	14.38	Mannum ...	1.78	7.00	12.50	8.04
Menangle....	3.65	11.39	12.59	13 90	Morgan	1.35	4.92	7.75	5.00
Kingston....	3.66	15.18	17.58	20.54	Overland Crnr	0.89	6.30	10.49	5.08
Robe	5 76	5.39	19.96	20.98	Renmark	0 75	5.71	8.90	6 55
Beachport....	10.13	17.21	23.61	26.49	Lameroo ...	2 28	—	10.99	9.61
Coonalpyn ..	1 84	10.24	10.14	13.72					

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of 3,300 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

DAIRY AND FARM PRODUCE MARKETS.

The Acting Manager of the Produce Export Department reports on August 4th—

BUTTER.

The exceptional weather experienced for this period of the year has brought in a wonderful supply of butter from all districts, and all grades are up to their usual standards. The prices have eased slightly during the month, the present values being—Superfine, 11½d. ; pure creamery, 10½d.

EGGS.

The egg market on the 1st July opened up at 1s. 1½d. By the middle of the month, owing to fair supplies and export trade with the eastern States being quiet, the market gradually receded to 11d. per dozen for produce auctioneer's lines and 1s. per dozen for first weight circle eggs. Then, on account of cold weather causing a shrinkage in supplies and inter-State markets showing an upward tendency, the rates increased by the end of the month to 1s. 1d. for auctioneer's lines and 1s. 2d. for first weight circle eggs. During the month there has been a growing local demand for circle eggs at up to 1s. 2d. per dozen for first weights and 1s. 1d. for second weights, and supplies have been well cleared.

Messrs. A. W. Sandford & Co. report the following quotations on August 1st :—

FLOUR.—City brands, £9 10s. ; country, £9 5s. per ton of 2,000lbs.

BRAN.—1s. per bushel of 20lbs.

POLLARD.—1s. per bushel of 20lbs.

OATS.—Local Algerians, 1s. 10d. per bushel of 40lbs.

BARLEY.—Cape, seed, 2s. 2d. per bushel of 50lbs.

CHAFF.—£3 5s., f.o.b. Port Adelaide, per ton of 2,240lbs.

POTATOES.—Gambiers, £5 5s. on trucks Adelaide or Port, per ton of 2,240lbs.

ONIONS.—Gambiers, £4 10s. to £4 15s. on trucks Adelaide or Port, per ton of 2,240lbs.

BUTTER.—Best factory and creamery, fresh in prints, 10d. to 11½d. ; second grade factories, 9d. to 9½d. ; well-flavored separators and dairies, 9d. to 10d. ; off-flavored lots, 8d. to 8½d. ; stores and collectors, 7½d. to 8½d. per lb.

CHEESE.—Factory makes, 5d. to 6½d. for large to loaf per lb.

BACON.—Factory cured sides, 7½d. to 8½d. ; middles, 9d. to 9½d. ; well cut and cured farm hitches and rolls, 6d. to 7d. lb.

HAMS.—9d. to 9½d. per lb.

EGGS.—Loose, 1s. 1d. per dozen for prime guaranteed new laid.

LARD.—Skins, 5½d. ; tins or bulk cases, 5d. per lb.

HONEY.—Prime clear extracted, 3d. ; lower grades from 1d. to 1½d. ; beeswax, 1s. 1d. per lb.

ALMONDS.—(Scarce) soft shells, Brandis, 7d. ; mixed soft shells, 6½d. ; kernels, 1s. 4d. per lb.

LIVE POULTRY.—Good table roosters, 2s. 6d. to 3s. each ; plump cockerels, 1s. 9d. to 2s. 2d. ; hens and light cockerels, 1s. 5d. to 1s. 10d. ; ducks, 2s. 6d. to 3s. 6d. ; geese, 3s. 6d. to 4s. 6d. ; pigeons, 7d. ; turkeys, 8d. to 10d. per lb., live weight, for fair to good table sorts.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Aug.	Sept.			Aug.	Sept.
Amyton	69	—	—	Meadows	96	—	—
Angaston	80	20	17	Meningie	†	20	17
Appila-Yarrowie	*	18	—	Merghiny	86	13	8
Arden Vale & Wyacca	*	—	—	Millicent	98	9	13
Arthurton	83	—	—	Miltalie	86	20	17
Balaklava	80	13	10	Minlaton	85	27	24
Beetaloo Valley	73	—	—	Mitchell	*	26	17
Belalie North	*	20	17	Moonta	†	13	—
Bowhill	*	—	—	Morchard	*	—	—
Bowmans	*	18	15	Morgan	89	20	17
Brinkworth	74	20	17	Morphett Vale	*	16	—
Bute	†	6	—	Mount Bryan	†	13	17
Butler	†	—	—	Mount Bryan East ..	76	20	3
Caltowie	74	15	17	Mount Gambier	99	13	—
Carrieton	69	18	15	Mount Pleasant	†	12	9
Cherry Gardens	91-2	16	13	Mount Remarkable ..	*	18	15
Clare	*	19	16	Mundoora	†	19	—
Clarendon	93	15	19	Murray Bridge	89	—	—
Colton	*	20	17	Nantawarra	82	17	14
Coomooroo	69	22	19	Naracoorte	100	13	10
Coonalpyn	89	—	—	Narridy	†	20	24
Craddock	70	20	16	Northfield	*	16	13
Crystal Brook	74	—	—	Orroroo	72	—	—
Cummins	85	20	17	Parrakie	90	6	3
Davenport	70	—	—	Paskeville	†	20	17
Dawson	71	—	—	Penola	*	13	10
Dingabledinga	*	12	9	Penong	87	10	8
Dowlingville	*	—	—	Petina	88	28	17
Elbow Hill	*	—	—	Pine Forest	85	16	13
Forest Range	93	18	15	Port Broughton	76	19	16
Forster	*	20	17	Port Elliot	96	20	17
Frances	*	19	16	Port Germein	77-8	—	—
Freeling	81	—	—	Port Pirie	78	10	3
Gawler River	†	—	—	Quorn	72	20	—
Georgetown	76	20	17	Redhill	*	16	20
Geranium	†	27	24	Renmark	*	—	—
Golden Grove	*	18	15	Rhine Villa	†	—	—
Goode	*	—	—	Riverton	*	20	17
Green Patch	*	15	12	Saddleworth	82	19	16
Gumeracha	94	15	12	Salisbury	82	2	6
Hartley	95	12	17	Shannon	*	—	—
Hawker	72	22	19	Sherlock	*	—	—
Hookina	72	20	—	Stockport	*	—	—
Johnsburg	72	13	10	Strathalbyn	*	15	9
Kadina	*	18	15	Sutherland	90	20	17
Kalangadoo	98	13	10	Tatina	100	—	—
Kanmantoo	*	19	16	Uraidla and Summit Ln	97	1	5
Keith	*	—	—	Utera Plains	89	20	17
Kingscote	*	2	6	Wakerie	*	—	—
Kingston	*	27	24	Watervale	83	—	—
Koolunga	*	16	13	Wepowie	73	—	—
Koppio	86	18	15	Whyte-Yarrowie	79	20	17
Kybybolite	*	18	15	Wild Horse Plains ..	*	—	—
Lameroo	*	—	—	Willunga	†	6	3
Lipson	*	—	—	Wilkawatt	91	20	17
Longwood	95	17	14	Wilmington	73	18	15
Lucindale	†	27	—	Wirrabara	†	—	—
Lyndoch	*	18	—	Woodside	97	—	—
Maitland	84	6	3	Yallunda	*	—	—
Mallala	*	8	5	Yongala Vale	79	13	17
Mannum	*	27	24	Yorketown	*	13	10

REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, July 12.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. O'Donohue (chair), Gunn, Ward, Baumgurtel, Brown, Stokes, Crisp, and Thomas (Hon. Sec.).

SUMMER FALLOW.—A paper from page 902 of the May issue of the *Journal* was read and discussed. Members agreed that summer fallowing was beneficial in covering all seeds, retarding evaporation, and preparing the soil for deeper ploughing later on. The experience of some of those present supported these opinions.

Carrieton, June 30.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Gleison (chair), C. G. Fisher, J. H. Fisher, G. Earle, and Bock (Hon. Sec.).

WHEAT AT MARCH SHOW.—Concerning the lack of interest displayed by wheatgrowers in the exhibit of wheat at this show, members considered that the inducements to exhibit were insufficient. There should be more prizes and of greater value. They also thought special prizes should be offered for wheat grown in the North and in the South. It was further considered that the exhibits should be confined to grain grown in the season immediately preceding the show.

BARE PATCHES.—It was stated that a local man had constructed a plough specially to break up bare patches so that the water would not run off so freely. Members thought this should be of considerable value.

RAINFALL.—An interesting table showing the rainfall for the past 12 years was exhibited by Mr. Fisher. The figures are given here:—1898, 9.71 in.; 1899, 10.46 in.; 1900, 10.67 in.; 1901, 8.53 in.; 1902, 6.56 in.; average for five dry years, 9.58 in. 1903, 13.52 in.; 1904, 13.42 in.; 1905, 10.58 in.; 1906, 15.52 in.; 1907, 12.20 in.; 1908, 15.69 in.; 1909, 14.9 in.; average for seven years, 13.69 in.

Coomooroo, July 18.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Berryman (chair), E. and C. Brice, Brown, Hall, H. and L. Avery, Toholke, M. Robertson, and Kildea (Hon. Sec.).

HARROWING GROWING CROPS.—Mr. C. Brice had been informed by the Assistant Director of Agriculture that one of the most progressive ideas in dry farming was that the growing crop should be harrowed as long as no serious damage was done to the young plants. The question was raised as to the best time to harrow a crop. Mr. Hall thought a few days after rain, or as soon as the plant had a few blades on it. It was generally agreed that the soil should be neither very wet or very dry, and that the harrowing should be done across the drilling.

Cradock, June 18.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. M. J. McAuley (chair), Patterson, Graham, P. and M. Neylon, Sullivan, Finch, Glasson, Harris, Gillich, Lindo, Adams, Smythe, J. J. McAuley (Hon. Sec.), and two visitors.

CARRYING CAPACITY OF DISTRICT.—Discussion took place regarding the sheep-carrying capacity of the holdings in this district. Efforts had been made to improve pastures and keep vermin in check. In the opinion of members one sheep could be kept here to every 10 acres, keeping the pasture in good heart, and obtaining the best results from the stock kept.

THREE-CORNERED JACK.—A sample of a plant known locally by this name was tabled. Although the plant formed good feed it was thought inadvisable to encourage its growth on account of the damage done by the seed to the feet of lambs and sheep reared in soft country.

Davenport, June 22.

(Average annual rainfall, 9 in.)

PRESENT.—Messrs. Roberts (chair), Holdaworth, Bice, Hogan, and Lecky (Hon. Sec.).

WATER CONSERVATION.—The following paper was read by Mr. Hogan :—"The question of water conservation is one which has engaged the attention of Australia in recent years and will become still more prominent in the near future. The subject is one of great importance to this district, especially to the producers. There is a considerable acreage of waste lands in Stirling North which could be rendered productive if the Saltia Creek had a dam thrown across it. Sooner or later the necessity for conserving water in this water-shed will arrive. It is a thousand pities to see such an abundance of water as this creek carries going to waste every year. From about November, 1908, to the same period of 1909, this creek was in flood eight times, which means, after the gardens had been fully flooded, a waste of at least 600,000,000 galls. This water found its way into the sea. In time of drought such a supply would be very acceptable to the producers of the Stirling district. If we had another seven years drought, like the last, and Nectar Brook was our only source of supply, it would be a very poor outlook for the farmers and producers, as experience has proved that Nectar Brook is not capable of supplying the demands that would be made upon it. I have two suggestions to make. One is that a dam be made about one and a half miles east of Stirling township, at a point known as Roseneath; and that an irrigation scheme be carried out similar to the Berri Berri or Pekina water scheme. Or, as an alternative, that a reservoir be put down at the foot of the Saltia hills. The former would be of great benefit to the Stirling residents, and the latter to all the producers outside that area. Failing that, an experiment might be made for the flooding of the country in and around Stirling by making a deviation in the creek. This would flood the land south of Stirling and enable lucerne to be grown, as well as other fodder plants. I feel certain this experiment would assist in utilising this country and prove financially successful. Irrigation schemes, so far as they have gone, have been a great success. I feel confident that if either of my suggestions was carried out, it would, from the beginning pay interest on the outlay." In the discussion which followed doubts were expressed as to whether Roseneath was the best place for a dam. It was pointed out that the soil in that locality was alluvial, having been washed down from the hills, and was of a porous nature. Woolundunga reservoir was quoted as similar soil, and this had been a failure. Another objection to the site was the small amount of land available for irrigation purposes.

ODDS AND ENDS.—A paper to the following effect was read at a previous meeting by Mr. W. G. Pryor :—"It may be thought that small matters on a farm do not count for much and are not of importance, but only the inexperienced have such an erroneous impression. It is not only the making of money that counts, but the taking care of it after it is acquired that often makes the difference between success and failure. At the present time economy may not perhaps be so necessary as in less prosperous seasons. Heavy crops, good clips, and top prices allow plenty of margin for waste and want of thrift, but even now economy is just as important to good management as ever it was, and the small items count for much in the annual balance. This does not mean mere frugality in spending, but also thrifty management and frugality in time and labor. Sometimes carts, reapers, and implements of all sorts are left in the open, exposed to all

sorts of weather. It is not difficult to form an opinion of the management of such a farm or station. The owner saves the expense of erecting a shelter-shed, and possibly the expense of a gate by placing some farm implement across the opening; but this is very far removed from economical management, and the probabilities are that you will find the fences down and uncared for, and everything similarly neglected on such a farm. This state of things is a sure sign of wastefulness and extravagance. It is just as necessary for a young man to study economical management as it is to study the art of growing good crops or good clips of wool. On a farm the cost of living should be very small indeed. A few sheep should be kept on every holding, no matter how small; a couple of pigs at least, cows, and fowls—providing meat, and butter, and eggs not only without cost, but if properly looked after, without much labor. Very often there will be a profit on these lines at the end of the year as well. In the garden fruit and vegetables can be provided at little cost. It is strange that on many farms no attempt is made to grow these necessaries. Not only are they necessary to healthy living, but when home-grown they materially reduce the housekeeper's bill. What a difference a few flowers make to the look of a house, and if nicely arranged on the table I really think they assist digestion. A garden round a house makes all the difference between a place to exist in and a home. Every farmer here should be able to grow raisins, currants, and fruit for preserves, &c.. A small garden does not require a great deal of water, and there are few farms in this district that are so situated that an ample supply of water cannot be provided without great cost. Any man with ordinary intelligence can plant a tree, and plenty of pamphlets are easily procurable which advise how to plant, prune, and cultivate them. The same applies to raisins, currants, and preserves. Drying the first requires no skill whatever; it is merely necessary to cut the fruit, place it in the sun to dry, take it in when dried, and it is ready for use. With respect to jams and preserved fruits, all information necessary is to be found in any reliable cookery book; and if the instructions are carefully followed and ordinary care taken there is no reason why fruits of almost all sorts cannot be available for use at any season of the year. The show of preserved fruits in the Government exhibit at the Exhibition just closed was an education, and worth going a long way to see. The amateur would not necessarily get his fruits and preserves up in show style, but that is no reason why they should not be equally good and pleasant to eat; and the luxury of having home-preserved fruits for the table, when desired, amply repays for the little trouble the preparation entails. I do not think there is a farm or station in South Australia where the finest of vegetables cannot be grown. Even our North-West country with very little labor, produces the finest samples in profusion. These little odds and ends to which I have alluded can be attended to in the odds and ends of time. A few minutes in the garden after a hard day's work is more restful oftentimes than reclining in a chair. There is one item, viz., the sheepskin, which is often neglected. Every skin should be either pegged out or placed on a frame directly it is taken off. A frame is easily made of rough timber, and the trouble of putting the skin on is not worth considering. The difference in the value of a skin so treated repays the little trouble it takes a hundred times over."

Dawson, July.

(Average annual rainfall, 10½ in.)

PRESENT.—MESSRS. Renton (chair), Wilson, Smart, John Wilson, Ferguson, Baker, W. A. Wilson, Mayers, Hughes, and Nottle (Hon. Sec.).

QUESTION BOX.—As the result of discussing the various questions placed in the box, the following opinions were expressed:—Some machines for spreading stable manure worked very satisfactorily. When manure was spread direct from drays and not evenly distributed the crop was very liable to blight off, although grass grew for a few years after this treatment. The best cattle for the district were the progeny of Shorthorn bulls crossed with common cows. In regard to fences, members preferred to use wire-netting for sheep lands, but where cattle were kept would put up a three-wire fence. Cattle horned wire-netting and made it practically valueless as a barrier against vermin. The Chairman always dehorned his cattle when young and put netting on all fences. It was thought that Australia's wheat would make very little difference to the world's markets. Nevertheless, it was thought well in this district to go in for mixed farming instead of relying exclusively upon wheat. Mr. Ferguson considered it unwise to feed oats to working farm horses, as they were liable to heat the blood and cause sore shoulders. He had had none of this trouble since discontinuing to give the animals oats. Members thought oats for light horses better than bran and pollard. It was considered that the standard wheat sack should be made sufficiently large to contain 200 lbs. of grain.

Hawker, July 18.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Rhymer (chair), Feinler, Palin, Cannell, Pumpa, Pyman, Smith (Hon. Sec.), and two visitors.

TREE-PLANTING.—Discussion on this subject took place. Mr. Pyman considered this was a very favorable year for tree-planting. It was necessary to provide shade and shelter, and pepper trees grew well in this district. The Chairman thought the Queensland bean tree would do well here. The beans were good food for fowls and stock. Mr. Pumpa was of opinion that trees should be planted which would be useful for timber. Some of the pines were well worth planting. They provided shade for stock, and produced timber fit for all farm purposes. The native acacia was said to be a good grower, and good food for stock.

Hookina, July 16.

PRESENT.—Messrs. W. P. Henachke (chair), Kelly, Sheridan, F. and S. Stone, J., T., and J. Henachke, Carn, Gloede, Madigan (Hon. Sec.), and two visitors.

TREE-PLANTING.—This subject was introduced by Mr. Kelly for discussion. Prior to the breaking up of the drought he had but little success in growing young trees. With the more favorable conditions of recent years, however, he had better fortune, and thought everyone should try to improve his homestead by tree-planting. Gums could be put 12ft. apart, in holes 2ft. square. They should be set about 15in. deep, after the bottoms of the holes had been well broken with a crowbar, and should then be filled in with good soil well tamped down. The soil round the trees should be a few inches above the surrounding soil, and drains should lead to each tree. Fifty trees planted in one year was a sufficient number to attend to properly. Mr. A. Henschke was of opinion that almond trees should be planted around homesteads. They gave good shade, and grew quickly.

Johnsburg, July 16.

(Average annual rainfall, 9½ in.)

PRESENT.—Messrs. Brook (chair), Smith, King, Read, Napper, and Chalmers (Hon. Sec.).

TREE-PLANTING.—Mr King gave his opinion as to the best way to plant trees, as follows:—"Holes for trees should be at least 2ft. square and 18in. deep. The soil in the bottom should then be loosened with a crowbar, and the trees should be put in with good soil. The trees should be set at the same depth as they were in the nursery, with the roots well arranged. There should be a space of from 18ft. to 20ft. between the trees. Planted in this way, they should make good progress.

Orroroo, July 22.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Robertson (chair), Roberts, Collins, Addison, Tapscott (Hon. Sec.), and one visitor.

WHEAT EXHIBIT AT MARCH SHOW.—This matter was fairly well discussed, and this Branch suggests that each Branch in those parts of the State in which wheat is grown might well undertake to supply one bag of wheat in grain and one sheaf in straw as a collective exhibit at the next March show.

Quorn, July 23.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Thompson (chair), Noll, Finley, Twopeny, McColl, Shulze, Brewster, and Pattern (Hon. Sec.)

WHEAT AT MARCH SHOW.—Members considered that a better exhibit of wheat might be made at this show if a prize were offered for wheat grown outside Goyder's line of rainfall instead of stating the fall in inches.

SELLING BAGS AS WHEAT.—The Hon. Secretary read the following paper under this title. This matter affected both the large and small wheatgrower. Last year wheat averaged roughly 4s. per bushel of 60lbs. and bags 6s. per dozen. In summer 3doz. bags weighed 60lbs., so that in parting with 30 bags of wheat the farmer gave away 18s. worth of cornsacks for 4s. He considered that wheat merchants should pay farmers 2s. or 2s. 6d. per dozen for all bags they bought as wheat, which would still leave a cost of 2s. per dozen to the farmer for the use of the bag. A local merchant last year sold hundreds of bags from which the wheat had just been tipped at 5s. per dozen, and made a double profit. If some such arrangement as this were made the 2s. or 2s. 6d. per dozen could be charged the second buyer if the first one passed the wheat on. If, on the other hand, the first buyer emptied the bags and resold them at 5s. per dozen he would still make a handsome profit on them. It might be said that woolpacks were sold in the same way, but there was no comparison between the price of wheat and wool per pound. Mr. Twopeny considered the woolsellars had more to complain of than the wheatseller. Mr. McColl thought it only reasonable that the farmer should provide bags to hold his wheat. Messrs. Finley, Shulze, and Brewster supported the view taken by the Hon. Secretary, and Mr. Noll thought things were best left as they were.

Wepowie, July 26.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Crocker (chair), T. and A. Gale, Chrystall, Knauerhase, Fuller, and Halliday (Hon. Sec.)

VEGETABLES FOR THE FARM.—Mr. T. Gale initiated a discussion on the question of the farm vegetable supply. He thought every farm in this district should have a garden. Good seed put into boxes of earth and well-rotted manure early in March would produce vigorous plants of many vegetables for setting out. A small flower garden also could, with advantage, be made; but in fruit-growing in this district he had little faith. He had tried vines and other fruits for 11 years without success. The sparrows spoiled everything. Members agreed that vegetables should be produced on every farm, but they thought fruit-growing would not be successful without irrigation. Mr. Crocker said potatoes did well in this district.

Wilmington, July 21.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Slec (chair), S. and D. George, Schuppan, McGee, Payne, Zimmermann, Farrell, Scholefield, and Jenche (Hon. Sec.).

APPLES OUT OF SEASON.—Mr. Slec tabled some apples which were grown in his garden since the March rains. They were quite ripe, and on being tasted proved to be well flavored and well formed.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, July 18.

PRESENT.—Messrs. Burton (chair), A. Bartrum, Fradd, Ryan, Curton, Woolford, Jacobo, F. Bartrum (Hon. Sec.), and four visitors.

CLEARING NEW LAND.—Mr. Fradd read a paper on this subject, and explained that his experience had been practically limited to the mallee land of this district. Of the

fertility of this soil there was no shadow of doubt, and from every point of view it was advisable to break up as much of it as could be dealt with. Where there were gum trees, they should be grubbed if possible, and he found the winter months the best in which to accomplish this. Fence posts, shed forks, and firewood should be cut out and stacked, and all the lighter wood burnt on the spot. Solid stumps were the most difficult to get rid of. This year, however, he had tried blasting powder with great success. The way to go to work was to bore an auger-hole in the stump close to the ground, and place in it a charge of the blasting powder—the quantity according to the size of the stump. This shattered the stump so that the fire could get at it and do the rest. Hollow stumps could be burnt out in dry weather. If a large quantity of mallee had to be dealt with scrub-rolling was the best method of clearing. In wet weather it pulled up a lot of stumps. All timber was at present realising a good price and selling readily. A good general discussion followed, in which the main points of the paper were dealt with.

Brinkworth, July 23.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. Brinkworth (chair), Stott, Heinjus, Wundke, Wood, Rowe, Morrison, and Hill (Hon. Sec.).

WHEAT AT MARCH SHOW.—Regarding the lack of interest in this display, members were of opinion that the conditions were too stringent. Having to measure off an exact acre of land and to reap the crop from that portion separately incurred a loss of time when time was most valuable. They suggested that not less than 20 acres should be made the condition respecting area of land; that an appointed steward should take an average sample of grain from this plot, of say 7 lbs. or more, instead of having specially-cleaned or graded samples competing.

Caltowie, July 18.

(Average annual rainfall, 17 in.)

PRESENT.—Messrs. Hewett (chair), J. and G. Lehmann, J. Potter, Petch, S. and C. Williams, Graham, and F. Lehmann (Hon. Sec.).

WHEAT AT MARCH SHOW.—Commenting upon the poor exhibit at the March Adelaide Show, members considered the quantity of wheat should be reduced to 3 bush. for exhibits in Bureau classes. Carriage on large parcels of wheat was a big item. They also thought exhibitors were subjected to a lot of unnecessary trouble.

Crystal Brook, July 16.

(Average annual rainfall, 15 in.)

PRESENT.—Messrs. H. Billinghamurst (chair), S. C. Billinghamurst, Burton, Cooke, R. and M. P. Pavy, Shaw, Jasper, Hutchison, Sargent, B. Weston, Sutcliffe, Lovelock, G. and A. Meill, Wood, Clark, and M. Weston (Hon. Sec.).

HAND SELECTION OF SEED WHEAT.—A paper on this subject was read by Mr. Shaw to the following effect:—"It is questionable whether farmers fully realise the vast possibilities there are in a systematic and intelligent hand selection of seed wheat during its growing stages, selecting those heads which are immune from diseases, which mature earlier, have plumper grain and larger heads than others, as well as those that resist the blighting effects of early scorching winds during spring—in fact, any heads that stand out prominently in the surrounding crop. It is necessary to note whether these heads have had any undue advantage in droppings from stock, more moisture by depressions in the soil, or have had more room than the general average of the crop. If a grazier

is going to build up a herd of cattle or a sheepfarmer a flock of sheep, he does not buy indiscriminately, but selects what he considers the best for the purpose. Sometimes he finds it advisable to crossbreed, which is fairly plain sailing with stock, but not so with crossing or hybridising of wheats. This had better be left to the Agricultural Department, which has the necessary knowledge and facilities: but selecting can be and has been done by the busy farmer without unduly encroaching upon his time. How many farmers recognise, when they are filling their bags with the golden grain, what they owe to Carmichael, Gluyas, and Ward, without mentioning other well-known farmers, who have by hand selection secured wheats which have helped to fill the pockets of the farmers and added to the wealth of the States generally? Could one estimate the amount of wealth that any of these wheats have added to this State it would read like a romance. It is impossible to arrive at any fair estimate: but if any men in this world deserve public recognition as benefactors of the farming community it is such men as these. They have the satisfaction, however, of knowing that they have erected their own monuments by materially adding to the wealth and prosperity of these States. Carmichael's Eclipse wheat was raised from one head by selection. It is a supposed self-fertilised cross between Ward's Prolific and Velvet Pearl. It would, therefore, perhaps be of interest to give a short history of Ward's Prolific, which was raised by Mr. James Ward (late of Nelshaby) by hand selecting from some seed wheats which he was experimentally testing in plots about 28 years ago. The season was a bad one for red rust, and most of the wheats were seriously affected with it. Mr. Ward noticed several stalks free from rust, carrying heads filled with a good plump grain. These heads were saved and the grain planted the next season, and so on; thus giving to Australia, by splendid foresight and intelligence, the parent wheat of those previously mentioned, besides others that are not so well known in this district. In the year 1890 Mr. W. S. Carmichael (then of Telowie) was walking through his crop of Ward's Prolific and Velvet Pearl, picking off the heads of wild oats. Red rust was pretty bad in these crops in places, when he noticed a plant with three heads that were well filled and free from rust. He broke off the three, threshed two of them with his hand and threw the grains in to his mouth to sample them. Thirty grains were obtained from the other head, and were sown late in the following season. From these 30 grains he had saved in 1894, three bags; 1895, 23 bags; and in 1896, 250 bags. This wheat is the well-known Carmichael's Eclipse. The first year it was sown alongside a crop of Dart's Imperial and other kinds which were simply rotten with red rust, but Carmichael's Eclipse was perfectly free, proving its resisting qualities. From the 250 bags reaped in 1896 he sold 150 bags. Gluyas is another hand selected wheat from Ward's Prolific. This is one of the earliest wheats grown in the States, but it has a tendency to go down through having a weak straw. Here is a chance for a farmer to select out of a crop of Gluyas heads from plants that show this weakness to the least extent, planting these in a plot, saving the most promising heads and planting them the next season. By so doing there is no doubt that this weakness can be overcome, and without taxing the farmer's time to any great extent. Carmichael's Eclipse is a wheat which is rather hard to thresh, especially in moist districts. This could be overcome by the same means; in fact, by hand selection wheats can be raised to suit almost any district and conditions. Most of you are aware that at the Roseworthy College by this method the yielding qualities of different kinds have been increased enormously. It has been demonstrated that by selection in the manner indicated the yield gradually increased every year instead of deteriorating, as it assuredly will if some system of selecting is not adopted by hand or grader. This is a good business proposition, and will well repay the farmer, as by so doing it frequently happens that a new and more valuable variety of the original is produced. It is estimated by the Victorian Wheat Expert that Federation last season increased the returns to the farmers of that State by £500,000. An increase of 1 bush. per acre is quite possible by selecting seed in these States, and this would put £1,000,000 sterling into the pockets of the farmers. Hand selection of seed wheat is receiving special attention in America, and they have formed associations for this purpose. In most of the Northern towns of this State there are numbers of retired farmers who could form themselves into similar associations for this purpose. They would have the necessary time and knowledge to carry out such work, most of them having had lifelong experience of wheat-growing. If such an organisation could be brought into existence there is no question that it would result in good work being done."

ANNUAL REPORT.—The Hon. Secretary reported that nine meetings had been held, with an average attendance of 20. The interest of the Branch had been well maintained, and papers on the following subjects read and discussed:—"Fodder for Autumn and Winter," "Power for Farm Work," "Tree-planting," "Science and Farming," "Tilling the Soil." The roll now numbered 34 members, being one more than a year ago.

Georgetown, July 23.

(Average annual rainfall, 18in.)

PRESENT.—**Messrs.** A. Hill (chair), G. and P. Hill, Page, W. and A. Thomson, McAnley, Freebairn, Bond, Wyatt, and Eyre (Hon. Sec.).

EXAMINATION OF STALLIONS.—Further discussion took place on this subject, which was dealt with in a paper read at the previous meeting. The general opinion of members was that the examination conducted by the Government Veterinary Surgeon was very necessary. Not only were some regulations desirable respecting animals now in South Australia, but to prevent the rejected stock from neighboring States from being brought in here.

Mount Bryan East, July 19.

(Average annual rainfall, 15½in.)

PRESENT.—**Messrs.** J. Thomas (chair), Gare, Teddy, Tralaggan, Doyle, F. Thomas, W. and T. Quinn, R. Thomas (Hon. Sec.), and three visitors.

SUBDIVISION OF PADDOCKS.—The question of subdividing the large sheep paddocks of this district was introduced by the Chairman. Fencing the land into paddocks of various sizes had gone on since the days when fences were practically unknown on the big sheep runs. There was still profitable work to be done in this direction, however, and by means of suitable paddocks greater profits could be won from sheep-raising. In most cases owners kept a variety of sheep, and these needed separate paddocks. Pastures varied so much that stock would eat out part of a paddock and leave other parts entirely. A dividing fence in the right place made it possible under such conditions to feed the pastures more evenly. The cost of subdividing and providing water, taking all things into consideration, was one of the best investments the local landowner could make. Comparatively small paddocks were admirably suited for raising fat lambs as freezers. Small lots would invariably thrive better than large lots, and feed could be reserved for lambing ewes. Several members agreed with the remarks of the speaker, and touched on other points in favor of subdivision of land in the way described.

Port Broughton, July 22.

(Average annual rainfall, 14in.)

PRESENT.—**Messrs.** Storr (chair), Donnelly, Hoar, Excell, Evans, Patingale (Hon. Sec.), and two visitors.

THE NEW AGRICULTURE.—Mr. Donnelly read a paper, in which he summarised the treatment of the subject by T. Byard Collins, in his book of that title. A *résumé* is given here:—"Farming of the present day is a process that is based on scientific knowledge gained in the laboratories of chemists and biologists. In times past the soil from which our food supplies were obtained was ploughed and planted, after spreading over it various materials—stable manure, bonedust, ashes, &c.—to make it fertile and produce the crops desired. The soil was stirred up to make it easy for the rootlets of plants to penetrate it so as to gather nutriment. The rains were relied upon to furnish drink, and where that was not enough, irrigation was resorted to to supply the needful moisture. When these things were attended to properly farmers thought there was nothing further to consider, and that a good harvest was assured. Intelligent farmers of the present day know that all the foregoing work is only of secondary importance, and that the successful growth of a crop depends more upon the presence and activity of living creatures which abound in the ground where plant life of any kind flourishes. The character of the soil depends upon that of the rock from which it originates. The difference in the nature of the original rock formations will naturally result in different kinds of soil—some places will be sand and others clay, the different kinds being adapted for different kinds of vegetation. The most important agent in fertilisation is a creature that requires to be magnified hundreds of times to become visible. These tiny organisms are everywhere, both in the animal and vegetable kingdom. They turn wine to vinegar; they sour milk and ripen cream for the dairyman; they determine the flavor of cheese; they are the active agents in all fermentation; they cause all decay and putrefaction; they gather and fix nitrogen

to vegetation needing it; they evolve acids of various kinds—they are manufacturing chemists. There is division of labor among them—they turn out different substances. They are carriers bringing food within the reach of plants which would starve and die but for their untiring labors. They are by no means one family or one species, but vary as much as do all the living creatures that dwell on the earth. At a temperature of 130° these bacteria cease all activity, and at a somewhat higher temperature may become inert for ever. They are most active between 75° and 100°. This is partly why plants grow best in summer, and why vegetation is more prolific in tropics than elsewhere. Bacteria stand cold better than they do heat. Freezing suspends their life, but does not destroy it. Different classes feed on different substances and perform different functions. They all require warmth and air, and are active in darkness, but not in light. Some feed on air mingled with particles of soil; others on moisture, though too much moisture stops their activity; still others feed on rootlets, to which they themselves furnish food; others obtain food from inorganic grit. It is possible, however, that all classes of soil bacteria feed on earth, air, and water at the same time, each class selecting therefrom what is necessary to the performance of its function. It was formerly thought that the rootlets of a plant had the power to assimilate inorganic elements directly from the soil and thence produce tissue to be used as food for man and beast; but it is now known that, with certain exceptions, neither plants nor animals can live directly on the inorganic. The elements that serve as food for plants must undergo decomposition and change by the operation of some lower order of life before they can become available as nourishment, just as the inorganic must be broken down and rebuilt into plant life before it becomes available as sustenance for man. Water is a great solvent, and it has to be remembered that the vegetation of a single acre draws from the soil from one-eighth to a quarter of a ton for every pound of dry substance produced, and that nearly all this water is passed from the roots through the plant and exhaled through the leaves. There is no doubt that this process has much to do with the carrying in of certain tissue-building material; but it does not account for the presence within the plant of such substances as silica, phosphorus, &c., upon which water exercises no solvent action. There are three forces that may be considered as capable of effecting the primary changes in these substances which so strongly resist being reduced to a soluble condition, viz., plant secretions, 'vital activity,' and soil bacteria. It was formerly thought that these resistant substances were broken down by the juices of the plant, which then sucked them in and digested them in the same way that food is digested by animals. In the light of present knowledge, however, that is deemed impossible. There is no reason for believing that a particle of mineral matter can be so absorbed. The sap certainly effects certain chemical changes, but they are of a building up rather than of a breaking down character, and are concerned with re-forming, carrying and laying down again of elements that were broken down and decomposed before they had found entrance to the inside of the plant at all. By the 'vital activity' of a plant is meant a power possessed by the rootlets to take from soil what is needed for the plant's well-being. Just how 'vital activity' operates in this regard is not at present known. That it is much concerned in the appropriation of food there can be no doubt, but it is not likely that it has much to do with the preparation of the raw material by which it is rendered fit to be sucked in by the plant. The matter of practical importance is the fact that the prime factor in soil fertilisation is the presence and activity of soil bacteria." The paper then dealt with the action of soil bacteria in fixing nitrogen from the air for the benefit of the plant, and described the experiments which had been conducted in the attempt to separate these bacteria and produce them for applying to soil where desired.

Port Germein, June 25.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Carmichael (chair), Crittenden, Stone, Hillam, Holman, Deer, Coe, Turner, and Blessing (Hon. Sec.).

SELECTION OF SEED.—The Chairman read a paper on the question of improvement of yields by selection of seed. Sometimes a farmer saw a nice-looking crop in a neighbor's paddock, and promptly ordered a parcel of seed from it when it should be ready. More often than not he was disappointed with the result, and the reason was that he did not examine the crop carefully enough to see that it was pure and true, to name. Although under certain circumstances a change of seed from another district might prove beneficial, he thought much better results on the whole would accrue if members would select

their seed and raise some from the best developed heads they could find. They had all seen in a crop some heads containing four times as many grains as others growing alongside, and their aim should be to produce them all like the few which now stood out so conspicuously. He would suggest that members should go through a crop and pick out the best heads. If only a bagful or even a bushel, some advance would be made. It was strange that some farmers after procuring good, clean seed did not take the trouble to keep it pure. It was absolutely necessary if this was to be done to thoroughly clean out drills, strippers, and harvesters, &c., and time taken in doing this was well spent. He had seen wheat grown continuously for 10 to 15 years with care, and to-day it yielded better than ever before. The greatest care was necessary to select only the very best heads, and to keep the seed pure when obtained. A vigorous discussion followed; most of those present agreeing with the writer. Some, however, quoted cases in which the best returns had been reaped from crops grown from shrivelled seed.

ANNUAL REPORT.—The Hon. Secretary reported that nine meetings had been held during the year, with an average attendance of 7.2 members. Of these two homestead meetings had been the most interesting and profitable.

Port Germeln, July 23.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Carmichael (chair), Crittenden, Stone, Head, Holman, Hacket, Deer, Blessing, Turner, and Stook (Hon. Sec.).

WHEAT EXHIBIT AT MARCH SHOW.—The following reasons were advanced by members to account for lack of interest in exhibiting grain from this district:—(1) The distance from Adelaide and the railway. (2) Owing to climatic conditions it was hopeless to compete against exhibits from districts which produced a heavier grain. (3) The quantity required, viz., three bags, was too much; if this were reduced to one or two bags farmers would be more likely to compete. Finally it was decided to send an exhibit to the next March Show.

Port Pirie, July 2.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Johns (chair), Munday, Welch, McEwin, Hawkins, Teague, Jose, Eagle, Hector, Greig, and Wright (Hon. Sec.).

CO-OPERATIVE MACHINE SHEARING.—Mr. Welch read a paper on this subject. "Machine shearing," he said, "was becoming general in pastoral country, but in farming and grazing districts it was but in its infancy. When it became more general it would be time for some co-operative system. The average farmer had no special shed for shearing purposes, and barns or stables had to be used. This involved a lot of cleaning up and erecting temporary fixtures, &c., which occupied valuable time. Frequently a team or two had to be left idle while the drivers assisted the shearers. All this could be overcome by the erection of one good shed and an arrangement with a company to do the shearing. In the Redhill district this had been done, with satisfaction to all concerned. The price charged was 6½d. per head, and this covered all work—including wool-classing by an expert, baling, and branding. In this way "bags" or "pockets" of oddments were avoided, and star lots were done away with; resulting in higher prices being realised. An advantage in this system would be that work which usually took a week would be done in a day. The sheep would not be yarded so much. Lambs would not be away from their mothers more than a few hours, and would not receive a set-back. At present yarding several times and driving the sheep through a race resulted in their being more or less knocked about. Each year made it increasingly difficult to obtain hand-shearers, and the machines were becoming more nearly perfect as time went on." In discussing the paper, Mr. Hector said there was difficulty with regard to paddocks for the flocks at the place where the shearing plant was installed, as the sheep would very quickly eat all the feed. If a large area of land was available, with facilities for paddocking, the system should work satisfactorily. It would be better for farmers and small flockowners to pay a small extra cost and have their sheep shorn

at a co-operative depot than for them to go to the trouble and expense of erecting shearing sheds and yards on their own properties. Mr. Munday thought co-operative machine-shearing had decided disadvantages, but he considered the scheme could not be worked satisfactorily in this district. He understood that several flockowners who had used the machines had discarded them, and were going back to the hand-shears. Mr. Hawkins considered the co-operative system would be of great advantage to small sheepowners. He expressed his willingness to become a member of a co-operative shearing company, and would do his utmost to help towards its establishment. Mr. McEwin agreed as to the advantages to be derived if the scheme could be carried out. A number of men were required for hand-shearing, and if wet weather was experienced much time was lost. Mr. Greig said it was necessary to put both systems to a practical test. The machines cut too close to the skin, and he had seen sheep actually burnt by the sun as a result. It was a mistake to cut too close. An extra amount of wool might be procured the first time, but the succeeding cuts would not be so good. He estimated that hand-shorn sheep were worth fully 1s. 6d. per head more than those shorn by the machines. Another drawback to the co-operative system was that the yards at the depots would generally be in a very dirty condition. The small flockowner could with a little trouble fit up his own appliances, and be independent of any co-operative system. The Chairman thought that even if a small extra expense were incurred it would be better have the sheep shorn at a co-operative depot. Mr. Welch, in replying, said a gain of 1 lb. of wool per sheep would be obtained by the machines over the old method.

TRIP TO EUROPE.—Mr. Hector read a further paper descriptive of portion of his recent trip to Europe.

Whyte-Yarcowie, June 25.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Pearce (chair), McCann, Mitchell, G. R. and C. D. Mudge, Ward, J. E. and W. Hunt, Walsh, Faulkner, Jenkins, Lock (Hon. Sec.), and two visitors.

ANNUAL MEETING.—The Hon. Secretary's report showed a membership of 18. Ten meetings had been held during the year with an average attendance of 12 members. Papers had been read on the following subjects:—"Provision of Food for Autumn and Winter," "Experimental Work," "Preparation of the Soil for Seeding," "Motor Traction for the Farm," "Sheep and Wool." Two meetings had been addressed by departmental officers, and a successful field trial of farm implements had been held. Members were alive to the interests of the community, and had moved with success in several ways for the betterment of town and district.

WHEAT EXHIBITS AT THE ADELAIDE SHOW.—Considerable discussion on this subject took place, and it was agreed that the special preparation of the wheat by exhibitors made it impossible for some to compete owing to the time and appliances required for this. It was thought that if some means could be found to overcome this, or if samples were confined to samples as taken from the harvester, much greater interest would be taken by the farmers generally.

GRUBS IN WHEAT.—Specimens of grubs were tabled, which were thought to have attacked the grain during the course of germination, arresting its development. In some instances the plant had sprouted and had got through the surface. The two blades had formed and then died off. The grubs were plentiful and apparently both young and old. They were to be found in the grain which had every appearance of having malted, although it was pointed out that the wheat was sown under circumstances very favorable to germination. One member had found similar grubs in flower pots after the plants had died.

Yongala Vale, July 16.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Battersby (chair), Miller, Chigwidden, Fowler, Keatley, Schmidt (Hon. Sec.), and six visitors.

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. J. Lloyde. Members were very pleased with the arrangement of the buildings on the homestead, the general management, and agreed that the farm was quite up to date, and reflected much credit on the owner. The splendid stock of horses was much admired. Considerable time was spent in examining a four-and-a-half horsepower petrol engine driving a Bagshaw No. 4 chaffcutter with elevator. The plant was set in motion, and practical

demonstrations were given of what could be done with it. A long discussion on gas engines for the farm took place. Members were of opinion that petrol engines were useful for light work only, and that oil engines were better for heavy work. It was also considered that engines were not economical if only required for occasional use on the farm. Horsepower met the same demands as an engine for this occasional work, and was much cheaper, even if hired labor had to be employed.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, July 23.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Wishart (chair), Friend, Plush, Sibley, Ball, Smith, Swan, Salter, Stephens, Matthews (Hon. Sec.), and two visitors.

MANURING ORCHARDS.—Discussion on this subject took place, and it was resolved to request the Hon. Minister of Agriculture to arrange for some experiments to be carried out by the Horticultural Instructor in various districts, in a somewhat similar manner to the spray tests recently completed.

REMARK METHODS.—Mr. Salter gave an interesting account of his recent visit to Renmark, and explained the methods of drying, cleaning, and packing, &c., which he saw there.

Balaklava, July 18.

((Average annual rainfall, 15½ in.))

PRESENT.—Messrs. Godfrey (chair), Tuck, Spillane, Thomas, Roberts, Twartz, Uppill, Baker, Wurful, Hoepner, Banyer (Hon. Sec.), and one visitor.

DEPTH OF CULTIVATION.—Mr. Spillane read the following paper on this subject:—“The class of soil to be dealt with must largely govern the depth of cultivation. I should fallow a heavy clay soil 4 in. deep. By ploughing deeper than this we have no better return per acre, and every additional inch in depth requires an extra horse in the team. In the light or limestone land plough according to the nature of the subsoil. Much of this land requires shallow ploughing, not more than 3 in. On sandy land that has a tendency to drift it is not wise to fallow at all. It would be better to plough it at seed-time to a depth of 3 in. In this district, where the farmers fallow most of the land intended for the following year's crop, before the cultivator is used the soil should be well harrowed. When weeds appear the cultivator should be run over the fallow; the first time to the same depth as the ploughing. Each subsequent cultivation should be lighter than the former, so that the last before the drill would be about 2½ in. deep, or just sufficient to cut all weeds. By such working it is easy to cope with weeds, and also to retard evaporation. The harrows are very useful after the cultivator in starting the seeds of weeds that may still remain in the clods, and also to pack the soil. In ploughing deeply, say 4 in. or more, we are liable to turn in wild oats and charlock seed, which remain buried for some considerable time before germinating, and these are brought to the surface again with subsequent deep ploughing. In my opinion, we should not plough more than 4 in. deep. When seeding, the drill should be put to work immediately after the cultivator. The seed should not be drilled too deeply. Very often if seed is drilled 3 in. or 4 in. below the surface, when germination takes place and the blade comes to the surface, it has to place new rootlets. This delays the plant, and in some cases, where the surface sets hard, the blade cannot come through. It would, therefore, be better to drill to a depth of about 1½ in. Seed drilled to this depth will appear earlier, and will be healthier than if put in deeper.”

Freeling, June 10.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. J. A. Mattiske (chair), Heinrich, Nelder, Koch, J. A. Mattiske, jun., Shanahan, C. H. Mattiske, jun., A. H. Mattiske, Steinfeldt, Elix, and Block (Hon. Sec.).

PROBLEMS OF AGRICULTURAL LABOR.—The Hon. Secretary read the following paper on this subject:—"Years ago the question of competent labor was very much simpler than to-day. Anyone who could plough, work harrows or scarifier, and drive horses, could be a farm laborer. At present we expect a great deal more. A farm hand should be able to adjust any little thing which may get out of order with the machine he drives. He should know the different parts, where there is the most wear, and which parts need the most attention. We do not want him to drive a machine until it is broken down. We also expect him to feed a chaffcutter, drive a trolley, saw wood, or start an oil engine. In fact, it is not so much muscle as brains we want, and it takes years of training to learn to perform all these duties satisfactorily. Yet we find young men, after learning to do all this work, leaving the farm to live in the town or township, and doing work which anyone with little training could perform, such as pick and shovel work, pitching hay, breaking stones, &c. It is a great pity that such men should be lost to the farmer, and we all know how difficult it is to replace them. So far every farmer will agree with me; but what can we do? A young man wishes to settle down and find a home for himself, and we cannot blame him. The solution of the difficulty, in my opinion, is this: If the laborer wants a home, give him one. Put up a cottage near the homestead, and give him a few acres of ground for his own use. Probably he will then be only too glad to remain with you. He will be able to keep a cow, poultry, a pig, and grow his own vegetables. He will be in a home with his wife and family, and will have comforts which he otherwise could not enjoy. Men, whether rich or poor, after a hard day's work, like to sit by their own fireside, where the difficulties of the day cease to trouble. Some may object to this proposal and say, 'A farm is not a benevolent institution. Why should we spend our money in building a home and giving away a part of our ground?' I would not spend a pound unless I thought it would pay. But look at this in the right light. To put up a four-roomed cottage and fence a piece of ground is all that is required. Farmers have their own teams; they can cart all the material and put up the cottage in spare time. There is no allotment to buy. The building, although substantial, need not be very expensive. In return they get a man to live on the farm who knows farm work, and when his master is away looks after the place. The man saves house rent, besides having the conveniences before mentioned. He sees that his employer does his best for him, and in his own interest he will do his best for his master. If a farmer carried out these suggestions he would have a working man's block on his own farm, much to his and his working man's benefit. Another problem a farmer has to deal with is the difficulty of getting labor at hay-making and harvest time. If one man is sufficient to do the work during nine months of the year, it will take three men for the other three months. That means that in a district where there is work for 100 men for nine months, 300 men are wanted during harvest time. The same trouble occurs every year, and farmers try to engage their men for that time of the year some months beforehand. Money is no object with them. They very rarely secure the same men two years in succession, and the men engaged frequently know very little about the work. The reason of this is that good men cannot wait for this three months' work, and try to get permanent positions. They are perhaps not able to command those high wages which a farmer will pay in an emergency, but they do better by regular employment. Therefore, the only way out of this difficulty is to try to find profitable employment for the same number of men all the year round. How to do this is a subject I do not intend to go into at present, as what would pay on one farm might not pay on another, and each farmer knows his own farm best. I will just hint at a few occupations which can be carried on in connection with hay and wheat-growing. Dairying, where there is grass land and suitable country for lucerne paddocks. Also fruit, grape, and currant growing. Almonds will grow on almost any ground, and may be planted along fences as a breakwind. Those farmers who have sandy, gravelly, and dry ground are sure to make a success with poultry if they look after them properly. Pigs have realised very high prices lately. In some parts, again, potatoes and onions can be grown successfully. I have seen onions grown in our district which were equal to those from Mount Gambier. These are some of the side lines which may be carried on in connection with wheat and hay growing. They may not be profitable at the outset, but as long as they pay their way at first, and give employment to the same number of men all the year round, will help to solve the question of agricultural labor."

Nantawarra, July 12.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Smith (chair), Nicholls, Sleep, Sinclair, Dixon, E. and A. Herbert, Sutton, (Greenshields, Dall, and Godsen (Hon. Sec.).

SELECTING RAMS.—In answer to a question, Mr. E. Herbert said a good way to pick stud rams from a number of lambs was to pick out those which appeared to be good and mark them. At shearing time inspect these carefully and reject any faulty ones. Later on further examine and reject any not up to the standard desired. Mr. Nicholls thought a good plan was to mark the lambs of good ewes, and from time to time inspect them and cull out those which were faulty. It was stated by Mr. Dall that quite 75 per cent. of his lambs this year were males. In other seasons the sexes were about equal in number.

ANNUAL REPORT.—The Hon. Secretary reported that nine meetings had been held with an average attendance of 8.3, being an increase of one member per meeting on the average for the previous year. Papers had been read on "Deep v. Shallow Cultivation," "Poultry," "Haymaking," "Trip to New South Wales," "Method," "Motor v. Horsepower," and other subjects had been discussed. Altogether the year's work had been very satisfactory.

Saddleworth, July 15.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. Frost (chair), Klem, Rex, Baldwin, Coleman (Hon. Sec.), and one visitor.

WHEAT AT ADELAIDE SHOW.—The following reasons were thought by members of this Branch to be partly responsible for the lack of interest shown by wheatgrowers in this exhibit, viz.:—(1) Trouble involved in preparing show wheat. (2) Wheatgrowers' attention not drawn to the matter at the right time. (3) Sample for milling required too early in advance of show. (4) The 10 acres of the variety might deter some. (5) Expense and attention required when showing in Adelaide. (6) Standard of high-dressed grain had been so high in the past that a farmer without a grader or special machines thought he would not stand any chance. Suggestions to make entries more attractive—(1) Advertise in weekly papers in January through the Bureau and wheatbuyers' agents, (2) Allow wheatbuyers' agents to make entries on behalf of the farmers. (3) The secretary to receive exhibits at Adelaide or Port Adelaide, stage on show ground, and if unsold return to grower. (4) Do away with the 10-acre limit. (5) Stipulate for milling samples not more than 14 days before the show. (6) Have the exhibits saleable at an advance of, say, 1s. upon market price. (7) Have a larger quantity on the ground, or let the exhibit be a fair sample of a much larger quantity, say 50bush. to 100bush. (8) Have the yield per acre declared by exhibitor. (9) Let the wheat be classed as (a) hard or strong, (b) medium hard, and (c) soft or weak in preference to "strength above or below 52lbs." which is not understood by many exhibitors. It was thought that weight per bushel had been made so prominent a point in show wheat that unless wheat weighed 67lbs. or 68lbs. it would be no use to show it; and as our best producing wheats, i.e., those which bring the money to the grower, are not especially heavy wheats, e.g., Federation, Marshall's No. 3, and Yandilla King, no one thinks it worth while to show them. Farmers take little interest in seeing a wheat weighing 69lbs. or 70lbs. to the bushel if they know it would never pay to grow the variety except for show purposes. Yield should be of the first importance, that is, money value per acre, in the same way as wool is judged upon its money value per fleece.

Salisbury, July 12.

PRESENT.—Messrs. Moss (chair), Sayers, Hartmann, L. Jenkins, Huddle, Whittlesea, Sexton, McGlashan, and Jenkins (Hon. Sec.).

POWER FOR WATER-RAISING AND FARM WORK.—The Hon. Secretary read a paper on this subject. For lifting water wind power was the cheapest, and if mills were kept in good order they would lift sufficient for the ordinary needs of stock and for the household requirements. Mills were largely used for garden supplies also, but here the one drawback was the necessity for large storage tanks. For mill and tank, the latter having a capacity of 30,000galls., £100 could easily be spent. He preferred a geared mill to one of direct lift, as the former worked with a lighter breeze, and there was much less vibration. The installation of a double-action pump would still further improve a plant of this description. For a garden requiring more water than could be supplied by two

windmills, he thought it would pay to put in an engine, and have, in addition, one mill. A 6-h.p. engine would probably do as much work as three or four windmills. Horse-works had almost everywhere given place to engines, and steam as a power for this and general farm work was rapidly being displaced by oil and petrol. Hot air engines could only be used for pumping plants, and even there were of little value if large quantities of water were required. For economical working the producer gas plant was ahead of all other types of engines; but as they could not be procured with less than about 12 horsepower, they were out of the question for ordinary farm or garden use. Probably the most popular was the oil engine, but this again was threatened for some classes of work by the petrol engine. When purchasing an oil engine one right up to the full power likely to be required should be secured, as the additional outlay and extra cost of running would be trifling. Petrol engines were very handy on account of their comparative lightness, small danger from fire, and the speed and ease with which they were started. For winnowing, chaff-cutting, and any other work where they were only occasionally used, they were very suitable. For work of a constant nature, however, he thought the oil engine would be most serviceable, and the cheapest in the end. For stationary work of an occasional nature, the horizontal petrol engine would probably give satisfaction, but the two-cycle vertical engine he would leave absolutely alone. There was a certain amount of waste in running in this two-cycle engine, and the bearings became worn a great deal, and allowed the escape of gas, and consequently loss of power resulted. The four-cycle type was much more reliable and economical in working, although the original outlay might be a little more. Comparing petrol driven with oil driven engines, the prime cost of the former was less than that of the latter, but the upkeep and cost of running of the petrol engines was fully 75 per cent. more than the oil engines. The latter were more reliable, and where the work warranted their purchase, they should be given the preference. Traction engines, driven by oil or petrol, would undoubtedly be made which would do farm work satisfactorily.

Watervale, July 13.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Sobels (chair), Duke, Solly, Burgess, Hamp, Tavender, F. Hamp, T. W. Sobels, Parker, Guthrie, and Seovell (Hon. Sec.).

BITTER PIT IN APPLES.—Some discussion took place concerning this trouble. It was said that in Victoria the application of crude soda to the roots of the tree had been found a certain preventive. The method of applying recommended was to scrape the top soil away, put the soda on and then replace the soil.

WOOLLY APHIS.—Mr. Burgess wished to know how to deal with woolly aphis. His trees had been apparently free from it until after the heavy March rains, when the blight began to appear very rapidly and extensively. [This matter is dealt with in the Inquiry Column of this issue.—ED.]

YOUNG GROWTH ON OLD TREES.—Mr. Burgess wished to know how to make an aged peach tree throw out spurs without cutting it back. [See Inquiry Column.—ED.]

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Arthurton, July 22.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. S. T. Lamshed (chair), Lomman, Rowe, A. G. Lamshed, Bull, Elix, T. and L. Howlett, and Stevenson (Hon. Sec.).

CO-OPERATION AMONG FARMERS.—The members of this Branch have for a long time felt the need of combination on the part of farmers, for the purpose of self-protection. For several years they have united in purchasing manure, binder twine, &c. An order

for over 400 tons of super. has been placed with a city firm, and also for one ton of binder twine. By this method the members secure the profits which would otherwise go to the middleman.

WHEAT AT ADELAIDE SHOW.—Mr. Rowe considered that the rules governing these exhibits at the March Show were far too stringent, and that while such conditions existed farmers would not trouble to compete. The Hon. Secretary thought that labor conditions in recent years had compelled the farmers to procure the most up-to-date machinery, in order to secure the crop, and that once it was in the bags they had neither time nor inclination to go to all the trouble involved in the preparation and forwarding of exhibits. Australian wheats would always find ready sale. Members agreed that the average farmer had too much to do to give the necessary time to this matter.

SHOOT-CUTTING.—Members agreed that no matter what time of the year mallee shoots were cut, they would grow again. The effective way to deal with them was to get out the roots. If this could not be done, the next best thing was to burn stubble and grass for three years in succession. When the shoots were very young, sheep would help to keep them down, especially the white mallee. The later in the summer that the fire was run over, the better the result would be.

Maitland, July 12.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Opie (chair), Bentley, Hasling, Hill, Jarrett, jun., Lutz, O'Grady, Tossell, and Pitcher (Hon. Sec.).

PLANT LIFE.—The Chairman read a paper on "Plant Life," a *resume* of which is given. "One of the most interesting subjects for study is the life of a plant. We are far more conversant with animals, and to most of us a wide gulf seems to separate the animal and the vegetable kingdoms. But such is not the case. It is very difficult to distinguish between some of the lower forms of animal and vegetable life. Take, for instance, the anemone, so common on our sea beaches. This is to all outward appearance a plant, and seems to be fixed in the sand, with its roots penetrating like those of a flower, with petals expanding and extending to the incoming tide, as does its namesake on the land to the sun. But touch the centre with your finger, and the petals enclose it with a grip and endeavor to pull it down to be digested. The 'sensitive plant,' which may be seen on application at the Botanic Gardens, is growing as an ordinary plant; but let a fly settle upon one of its leaves, and at once the stems and leaves close up. In other, and especially tropical countries, many other plants catch and eat insects or animals. One of this species have I observed here. The so-called 'snowdrop,' a very fine creeper which twines itself around the tussock grass, and has leaves which resemble cups with fine hairs on the edges: This plant catches small flying gnats and other tiny insects, and I believe devours them. So the line of demarcation 'twixt plant and animal is very fine indeed. Let us continue. An animal breathes by its lungs; the plant breathes through its leaves. Each plant is, through its leaves, extracting from the air that food which is necessary for its growth. The plant inhales the common air, takes out of it the carbon which it requires, and returns to the atmosphere pure oxygen which we require; whereas we in breathing retain the oxygen and exhale carbonic acid gas, which is required by the plants. With some of us the soil and what is in it is our main thought. From experiments carried on in Saxony it has been found that out of every 100lbs. of wheat harvested only 1lb. has come from the soil, the balance being drawn from air and water. Flowers, by their colors, attract insects, and these carry pollen and fertilise the seed. In the struggle for existence the stronger win and the weaker go to the wall. Some plants furnish their seeds with means for being carried by the wind to some suitable place for growth. The burs are provided with hooks whereby they are attached to some animal and deposited far away. The tree lucerne throws its seed to some considerable distance by the explosion or sudden bursting of the pod. The higher forms of animal life have few young. The horse, cow, &c., perhaps one per year, whilst the codfish produces its million, of which only a few reach maturity. The young are in some cases richly endowed, and, as in the case of the almond, ready-made foodstuff for the use of the youngster is there until its green leaves are in a position to draw from the air the necessary ingredients for growth. As in animal life we are the prey of other parasitical animals, germs, or microbes, so the plants are subject to parasitic growths. Here again is more food for thought. Rusts, smut, takeall, are parasitic diseases of the wheat plant. The few remaining sheoaks near the town are the prey of a parasite which drains their juices and leaves them dried and decaying."

ANNUAL REPORT.—The Hon. Secretary reported that nine meetings had been held, with an average attendance of nine and one-third members. Two papers were read, and many subjects discussed. The 12 months' work showed an improvement on preceding years.

Minlaton, July 23.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Boundy (chair), Martin, R. H. MacKenzie, Vanstone (Correll, Bonnett, Lang, Giles, and J. McKenzie (Hon. Sec.).

WHEAT AT MARCH SHOW.—Discussing the lack of interest displayed in this exhibit, Mr. Correll said that on two occasions he had exhibited wheat, but the prizes were not sufficient to cover expenses. If the prizes in Class H, presented by Alex. Murray, Esq., were subsidised pound for pound by the society, probably there would be more exhibits. Members doubted whether many of the exhibits were a fair sample of the wheat grown. They thought it would be a good plan to have the exhibits taken from the wheat being delivered to the merchant. It was also considered that there should be separate classes, as the strongest milling wheat was not by any means necessarily the most prolific or most profitable to grow.

VETERINARY SURGEON FOR DISTRICT.—Members were of opinion that the district of Minlaton was sufficiently large to occupy the whole of the time of one veterinary. They therefore arranged to canvas the district and endeavor to obtain a sufficient guarantee to induce a competent man to settle in the locality. Members each undertook to canvas a certain part of the district.

Pine Forest, June 21.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. Johns (chair), Inkster, Goodridge, Nelson, Edwards, Schultz, Barr, jun. (Hon. Sec.), and one visitor.

TAKEALL.—The Chairman introduced this subject for discussion. Takeall, he said, was a very serious foe indeed, both in its ravages and the difficulty of finding a satisfactory preventive. It was common 50 years ago, and he thought the problem was not any nearer solution now than then. The malady had caused losses of hundreds of thousands of pounds to producers, and he remembered when wheat-growing in the vicinity of Lyndoch Valley had to be entirely abandoned on account of this disease. He alluded to the wreck of fields in this district two years ago, the appearance of which was appalling. Selections from the *Journal* were then read, and a general discussion followed, when instances were quoted of takeall having evidently been brought about by over working the land, especially when in a dry state.

WESTERN DISTRICT.

Cummins, July 16.

PRESENT.—Messrs. Sabey (chair), Potter, Cooper, Hamilton, Scholz, Hall, Sanderson, Nowworthy, Siviour (Hon. Sec.), and 10 visitors.

BUREAU WORK.—A paper on this subject, written by the Chairman of the Mallala Branch, and published on page 997 of the June issue, was read by Mr. Cooper. Considerable discussion followed, and it was decided to introduce the "Question Box" at the next meeting.

SOAKING COLLARS.—In reply to a question, Mr. Sanderson said new collars could with advantage be soaked. When working in a wet collar the horse pulled it into shape, and made it fit without damaging it.

FROST.—Mr. Potter, in reply to a question as to whether the frost damaged crops in this district, said the frost was blamed for poor heads of wheat, for which it was not responsible. If heavier applications of super. were made there would not be so many dummy heads.

Koppio, July 20.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Price (chair), G. B. and F. and M. Gardiner, Brennand, Barrand, F. and R. Richardson (Hon. Sec.), and one visitor.

SUPPER IN BULK.—Members decided to combine efforts for the purpose of purchasing a quantity of superphosphate.

OLIVE OIL.—The Hon. Secretary tabled a sample of olive oil made by himself. Members thought the oil was of very fair quality.

Merghiny, July 7.

PRESENT.—Messrs. Talbot (chair), Bubner, Shilton, Moody, Schartz, and Symonds (Hon. Sec.).

WATER CONSERVATION.—The Chairman read a paper on this subject, which, he said, was of great importance in a new district. The underground supply in this locality was uncertain. The absence of good holding ground made dams impracticable, and it was therefore necessary to provide tanks of masonry or concrete faced with cement. Concrete could be put in with boards, or simply laid on sloping sides with a shovel. The stone used in concrete should be broken to a 2in. gauge, and the tank should be square or oblong. He used mortar made with two parts of sand to one of lime. Before the wall became too dry it should be faced with $\frac{1}{2}$ in. of cement (one and a half parts sand to one of cement). When this was all dry a coat of tar and pitch was put on hot in the proportion of 7lbs. pitch to 10galls. of tar. A good roof could be made of ti-tree brush. If putting the concrete on the sloping sides without boards it should be well rammed to the sides, or spaces might exist which would cause the wall to crack when the pressure of water was applied. The bottom of the tank, made of the same material as the sides, should be well rammed. To make a good run for the water to the tank, he ploughed the land lightly and then stamped it down with a light dray or wagon; but that matter must necessarily be affected by the nature of the soil. If constructing the tank with masonry it would be found most satisfactory to make it round. There was less evaporation from a deep tank than from a shallow one, and of course the necessity of choosing a site with a good catchment was evident. In reply to a question the writer said concrete should be 8in. thick and masonry not less than 12in. Members were of opinion that it was best to roof tanks of this description with iron, as with ti-tree and other brush the forks and rafters rotted away and spoiled the water. Cement roofs were not satisfactory; they fretted away, and the continual jarring of the trapdoor caused cracks, &c. Mr. Bubner thought all corners and edges should be rounded off, and members thought the finishing coat should be made of two parts sand to one of cement.

RED WORMS.—Mr. Bubner said that 15lbs. of rock salt and 15lbs. sulphate of iron in 1,500galls. of water killed all red worms.

Merghiny, July 18.

PRESENT.—Messrs. Talbot (chair), Bubner, Shilton, Shorne, Schawtz, Moody, Symonds (Hon. Sec.), and two visitors.

PICKLING WHEAT.—Discussion on this subject took place. Mr. Schawtz had last year tried floating the bunt balls off the seed wheat, but the crop was so badly affected that he had to cut it for hay. [If the seed was not pickled no other result could reasonably be looked for.—Ed.] Mr. Talbot and others said that last year was the first occasion on which they had seen smut (bunt) in self-sown crops. Members agreed that seed wheat should be pickled to prevent this disease.

STALLIONS.—Members agreed that stallions should be examined, and, if sound, granted certificates to that effect.

Miltalie, July 16.(Average annual rainfall, 14 $\frac{1}{2}$ in.)

PRESENT.—Messrs. J. S. Jacobs (chair), F. and T. Jacobs, J. W. and E. Story, W. G. and E. P. Smith, Searle, Laffin, Powell, Ramsay, O'Connor, Alm, Parks, Atkinson, Hier (Hon. Sec.), and six visitors.

PROTECTING HAYSTACKS.—A paper on this subject was read by Mr. S. Jacobs. He thought the best method of covering stacks in this new district was to put on 10ft. sheets of galvanized-iron in sections. Two sheets would form a section, and each section would be bolted on to a piece of 3in. x 2in. Oregon top and bottom. At the lower end he would fix an eye-bolt. There would also be two eye-bolts at the top end of the sections which

were to go on one side of the stack, while those for the other side would be fitted with two hooks, each of which would fit into an eye-bolt on the top of the opposite section. A weight would be suspended from the bottom of each section. Half a ton of iron would cost about £10; bolts, &c., would cost £1; and this would material roof a stack 17yds. by 6yds. Stacks should be built on stones or posts, to prevent loss from moisture. If hay was protected in this way there would not be so many ailments among horses. Hay should not be carted too soon after cutting, or it would be damaged as badly as with water. A good discussion followed, in which members agreed that more care should be taken of hay. Iron was considered to be the best covering for stacks.

Penong, July 9.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Brook (chair), Edwards, Wold, Farrelly, Lovell, and Oats (Hon. Sec.).

FARM EQUIPMENT AND MANAGEMENT.—Mr. Edwards read a paper on this subject. In places where the result of well-sinking was doubtful he recommended making a good underground tank. The first coat of plaster should be one part sand and one part cement and the second coat two of cement to one of sand. Cementing should be done at the commencement of winter, so that the tank would soon have water in it, because the cement if exposed to hot weather with no water in it would crack and give a lot of trouble. If left empty for only a few weeks it should be tarred, for safety. The paper continued: "Roof with iron if possible; brush will do to protect the walls and to lessen evaporation. Put up a big iron shed to secure water from all light rains. Nineteen years' experience has taught me that without such sheds to catch water a tank may be empty for two seasons; but with plenty of tanks and sheds ample provision can be made. Having provided for water, push on with scrub clearing. Clear 300 or 400 acres the first season if possible, and add to it each season. Build new tanks each year, to keep pace with the requirements of increased stock, and put all available cash into iron roofs to catch water. When fencing the crops use 3ft. 6in. netting of 1½in. mesh. Put it up with care and keep it in order, and you will not have much trouble from rabbits. Six inches of netting should be put into the ground, and it will pay to put brush or sticks into the trench before filling in the soil. The netting should be strained up to its full height of 3ft. above ground. Bad work in fencing means loss of crop and endless trouble. In regards to wheats—I find Federation a good yielder; it does not shake out or go down. The next best variety with me is Comeback. Carmichael's Eclipse is a good yielder—rather tough to reap. Smart's Early yields well, and is a good hay wheat. Steinwedel is a good wheat, though it shakes out, and in very wet seasons is liable to rust. It pays to grade all seed wheat. The rubbish can be given to pigs. Wheat should be well ripe before it is reaped, or it will shrivel and lose weight. Super. is a necessity for good yields; 25lbs. per acre is a good help, but it pays to put on 50lbs. or more in this district. Wheat should be pickled before sowing, and the McCabe system seems to me to be the best. For harvesting I like the stripper, and clean with the motor winnower. As soon as enough land is cleared, fallow some, but fallow early or not at all. If this work is done after the middle of August there is great danger of the soil of this district drifting in a dry season. All machinery and implements, wagons, carts, &c., should have a coat of paint, and harness should be oiled once a year, and should be kept under cover when not in use. It pays best to rear one's own horses, cows, pigs, and poultry, getting fresh stock to improve the strain at intervals. Enough sheep for rations can also be kept with advantage. House-building and other conveniences should take second place—when water conservation and the successful growing, protecting, and handling of the crop is concerned." Discussion followed. Mr. Wold thought it advisable to sink a well if water could be obtained. Members spoke of the value of fallowing in keeping down weeds, improving the soil generally, and conserving moisture. Other points touched upon in the paper were agreed with.

ANNUAL REPORT.—The Hon. Secretary reported that 10 meetings had been held, with an average attendance of 7·2 members.

Penong, July 13.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Shipard (chair), Edwards, Oats, Kalmar, Kreig, and J. Oats (Hon. Sec.).

WORMS IN HORSES.—The Chairman read a paper on this subject. He had suffered considerable loss this year through worms in his horses. The following treatment had

proved very useful when santonine and tartar emetic was not available, viz. :—Keep the horse without food for a day and a night. Put two tablespoonfuls of arsenic and one tablespoonful of washing soda into a quart of water and boil until dissolved. Give one teaspoonful of this mixture in the feed morning and night, and, if the horse does not scour too much, continue the medicine for two or three days. Three meals a day only should be given for two days, and a good part of these should be bran. The animal should have ready access to all the water desired. [The veterinary surgeon strongly advises caution in the use of arsenic for worms. In the quantities mentioned it would be very dangerous to stock.—Ed.] The paper continued :—“Some horses, being weaker in the stomach, will show the effects of the medicine in less time than others. Some discretion is therefore necessary, and the doses must be varied accordingly. If the dose is too heavy a soft swelling at the flanks and armpits will appear, which indicates arsenic poisoning, and the horse will sometimes become griped. I treated 32 horses with one tablespoonful for a dose, but found it far too strong, for a number of them showed signs of inflammation and were scoured very badly. They were kept in the yard and fed for 24 hours. It was several days before they recovered from the effects of the treatment, but most of them were better for it afterwards. Six of the poorest ones were treated with santonine and tartar emetic for a week and five improved. One still seems stiff in the back and one hind leg is stiff and swollen about the thigh and rump. Worms are blamed for a great deal of illness in horses, but I think the horses have some sort of fever, they scour very badly at intervals and are very weak at work.” Mr. Edwards had used santonine and tartar emetic for worms, and when using arsenic for other purposes had found it was not uniform in strength. If it could be relied upon in this respect it might be useful for worms, but he had not previously heard of it as a remedy for that complaint. Mr. Kalmar considered arsenic an effective cure for worms in horses, but found a weak solution best.

DRY BIBLE.—The Chairman said he had had several cattle showing symptoms of what was generally termed dry bible. He had cured them, however, with a tablespoonful of chittanago, three times a day, in chaff, bran, and pollard, thoroughly wetted. After the first day an improvement was noticeable in the appearance of the affected beast. In the case of animals which had become too ill to eat chaff and pollard he gave the medicine in 2galls. of wheatmeal gruel, twice a day. To one dose each day he added also a pint of molasses. He had six cows and heifers ill, but saved all but one; and in that case, owing to pressure of work, he failed to give the treatment early and completely enough. The symptoms were dry nose at first, general dull appearance, stiffness in front legs, rounded back, lying about more than usual, and loss of appetite.

Petina, June 25.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Penna (chair), Kenny, W. H. Howard, S. J. Howard, Newland, Boscombe, Doley, Dunn, Newbon, and Souter (Hon. Sec.).

HORSES.—Mr. Newland read an interesting paper on “Horses.” After tracing the history of this animal as far as it was known, and having referred to the first importation to Australia, the paper continued :—“The true Suffolk Punch is not now found in its purity. It stood from 15 hands to 16 hands high, was large-headed, low-shouldered, and thick in the withers; deep and round-chested, high in the croup, large and strong in the quarters; round in the legs, and short in pasterns. This horse throws his whole weight into the collar, has sufficient activity to do the work effectively, and hardiness to stand long days. The excellence of the Suffolk is its nimbleness of action and the consistency with which it will pull. The Clydesdale is a good kind of draught horse, which hails from the district of Clyde, in Scotland. He is larger than the Suffolk, has a better head, lighter carcass, and deeper legs. He is a strong horse, hardy, and quiet. I am of opinion, however, that the best way to breed a horse for farm work in this district would be to mate a roadster or hackney stallion to Clydesdale or Suffolk Punch mares. This would produce weight and activity combined. If you wish to breed buggy or carriage horses, mate a blood stallion of moderate stature to mares half or three-quarters blood.” The paper concluded with a description of some of the complaints which trouble horses, and the recommendation of certain remedies.

SUPERPHOSPHATE.—Mr. Kenny wished to know whether there was any difference in the quantity of phosphoric acid present in Wallaroo and Mount Lyell super. [Analyses of these supers. were published in the March issue of the *Journal*.—Ed.]

Utera Plains, July 16.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Gale (chair), Venning, R., H., and T. Hornhardt, Stephens, G. and A. Barber, Chase, Lee, Naughton, Guidera, J. and M. Abrook, Holmes, and Ramsey (Hon. Sec.), and six visitors.

SCRUB CLEARING.—Mr. J. Abrook spoke of the density of the scrub in this district 30 years ago, and the first use of logs for clearing purposes. The logs were pulled by bullocks, and as years went by many improvements were made in the method of getting the scrub down. The scrub-roller also came on the scene, and in its present form he thought it could deal with scrub just as well and as economically as the log. Members generally favored the use of the roller for light scrub and the log for heavier timber. The advantage of the roller was that horses were employed to pull it, and they were then available for cultivation.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, June 24.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Hill (chair), Bone, Fidge, jun., Liersch, Venning, Wall, and Cavenagh (Hon. Sec.).

FEDDING POULTRY FOR EGGS.—Mr. Venning read a short paper, in which he said he believed two kinds of food were essential for egg-production, viz., wheat and green stuff. Oats, drake, scraps from the garden, &c., could be boiled and fed in a mash with pollard as extras. As a day's rations he would give boiled wheat in the morning, dry wheat during the day, and a plentiful supply of cabbage or kale leaves once a day. Fowls should also be allowed a good patch of grazing land. It did not matter much in what order the food was given, but it should be regular and in rotation, giving enough, without over feeding. Mr. Wall preferred to soak wheat, instead of boiling it. Bran and pollard, he thought, should be given hot in the winter mornings, but in summer it was too heating. Mr. Hill said he had killed fowls by giving them salt, and warned others not to make the same mistake. In reply to a question, Mr. Venning said drake should be boiled, as if fed dry it was too fattening.

Morgan, July 16.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), Hausler, Pope, Keough, Kempel, Heppner, R. and H. Wohling (Hon. Sec.), and one visitor.

COTTON BALLS.—It was stated that the local butcher had found that cotton balls were numerous in sheep and cattle which he killed. Members thought these were in the cattle which were brought from dry districts when green feed here was plentiful. Others thought cattle and sheep might have these cotton balls for years without any harm resulting.

WHEAT EXHIBIT AT SHOW.—In this district the average sample of wheat was poor last year, but members said that if a better harvest of grain was realised this season they would try to help form a good exhibit. Mr. Hausler said all Branches in wheat-growing districts should help to make this exhibit a success, as a good show would be of benefit to all growers.

Murray Bridge, July 12.

PRESENT.—Messrs. McIntosh (chair), J. and E. Stecker, Lehmann, Doyle, Clare, Horford, L. S. Dorie (Hon. Sec.), and three visitors.

DAIRYING ON RECLAIMED LAND.—Mr. Lehmann read a paper on the improvement of the dairying industry on reclaimed areas of the Murray. He considered that the Murray Valley was destined to be the main settlement of dairying in South Australia, but though facilities were at present far from perfect. The paper continued: "To make dairying profitable there are three essentials, viz., sufficient land of the desired quality, good water and feed in plenty, and a dairy herd of the best milking strain, obtained by careful breeding from only the choicest cattle. To undertake dairying on the reclaimed swamp

lands it would be necessary to hold at least 30 to 40 acres of good land, with an additional 30 to 40 acres of dry land for homestead purposes and winter grazing. The dry land should be in close proximity to the swamp lands to avoid waste of time in travelling stock to and fro, and also to ensure dispatch in carting the fodder to the feeding pens. It has become the custom here to feed lucerne principally, without a sufficient variety of other classes of fodder. This has proved to be a mistake, as first-class quality butter cannot be obtained by such feeding. Lucerne, when fed in large quantities, whether green or as hay, will produce butter of a bitter taste which will not keep very well. Although 10 acres may produce enough lucerne to feed a dairy herd, to cut and cart all the feed would become too costly to pay at the present butter price ruling. Therefore, part grazing must be resorted to to minimise the cost of feeding. So it becomes necessary to have a greater acreage, and a varied assortment of the best grasses should be grown to obtain the best quality butter. Hand-feeding in the open can be resorted to in fine weather, and stock can be fed in the shade of pine trees by means of feeding racks made under the trees. I find this an ideal method, as the cows are sheltered from the intense heat, and in the winter from cold winds. Provision should be made to feed under a dry shelter while wet weather prevails, as otherwise milking cows will decrease their supply of milk and will not always recover with the advent of fine weather. Good clean water should always be available, as milking cows will consume large quantities, and will drink two or three times a day in hot weather. The finest fodder and best methods of feeding will not make dairying profitable unless the herd is of the best milking strain. Feeding duffers will not produce cream. To obtain good dairy cows has been a difficulty with the present occupiers of swamp lands. Times without number one may make purchases without obtaining first-class dairy cows to start breeding from. Although numbers of cattle men maintain they have a fine milking strain, they only part with their inferior animals. The breeding of fine dairy stock of a milking strain has not been carried on long enough to ensure the production of a good percentage of really good cows. The Murray Valley will, no doubt, become a large dairying district, and as our greatest difficulty is to obtain dairy stock up to the required standard, I would suggest that a model dairy farm should be established on the banks of the Murray. This might be on a small swamp at the upper end of the hundred of Burdett, or on portion of Mypolonga, so that a start could be made to breed up a model herd, and settlers could obtain some of the surplus stock at moderate prices to breed up herds of their own. The dairy farm should be self-supporting." In discussing the paper, members agreed that fresh water should be available at all times, therefore all swamp blocks should run right through from back to front, and a suitable back channel be cut right round to conduct fresh water. All main drains should be fenced and stock watered at well timbered offsets. Blocks should include not less than 20 acres of swamp and 50 acres of high land. Grasses already found most suitable for the swamp were: For summer—*Panicum crus galli* and *Paspalum*; winter—*Phalaris commutata*; and for highlands—*Panicum molissimum* in the summer. Mr. McIntosh thought the American lucerne haymaking machinery would, to a great extent, overcome the labor difficulty.

Parrakie, July 23.

PRESENT.—Messrs. Dayman (chair), Sowerby, Diener, Beelitz, C. and O. Heinzl, Dayman, McLean, Wittwer, Schmidt, W. and F. Threadgold, Morrisson, Bastain, Neindorf, Burton (Hon. Sec.), and two visitors.

HORSES FOR DISTRICT.—Mr. Schmidt considered a medium-weight draught horse best for this district. He thought farmers should breed their own stock. Foals should be well fed, to keep them growing and to give them a nice coat. Horses should not be worked until two and a half or three years old, and then should only have light tasks at first. When first working young horses, good harness should be used. Collars should be well stuffed, and must fit well. Backbands were a great advantage, and prevented chains from rubbing the sides of the horses. All harness should be oiled twice a year. Members were divided in opinion as to whether heavy or medium draughts were best for farm work.

Sutherlands, July 16.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Snell (chair), Doecke, Thiele, Mibus, E. Twartz, Broadbent, Noack, Dohnt, Byrnes, A. M. Twartz (Hon. Sec.), and five visitors.

WHEAT EXHIBIT AT MARCH SHOW.—Respecting the lack of interest displayed by farmers in the wheat exhibit of the Adelaide Show, members considered the notices

were sent out rather late last year. Crops were usually early in this district, and it was inconvenient to enter under the circumstances. Several undertook to compete at the close of this season, and wished to know whether the grain should be graded, or only cleaned with the winnower. [As the best sample of wheat is to receive the prize it is not likely to be carried off by wheat which has only been cleaned with a winnower.—Ed.]

ANNUAL REPORT.—The Hon. Secretary reported that since the Branch had been reconstituted, in January, 1910, six meetings had been held, with an average attendance of nearly eight. Three papers had been read and considered, and various subjects discussed.

Wilkawatt, July 16.

PRESENT.—Messrs. W. Bowman (chair), D. Bowman, C. and T. Sorrell, sen. and jun., Arbns, H. and E. Brooker, J. and G. Altus, Ivett, Tylor, Neville, O'Shea, Dunn, Shulze, Phillips, Harvey (Hon. Sec.), and three visitors.

WORKING AT SEASONABLE TIMES.—Mr. Neville read the following paper under this title :—"Every farmer should try to do his work at the proper season. The best time to roll scrub is during August, September, and October. This gives the shoots a chance to get well up before burning. Cut the lines and get to work as early in August as possible. As soon as you have rolled a chain round the piece of scrub the brake should be cleared without delay and fallowed straight away, because there is usually no fire across it to sweeten it. If scrub-rolling is left until after harvest it is cruel to horses and men, and you cannot expect good results in burning. If, for instance, you start in the beginning of February it is too late to think about fallowing brakes, and a lot more super. is necessary to get any crop there at all. Further, if the timber is large it must be left until the latter end of March before burning, and by that time it has had a good deal of rain on it. There will be few (if any) shoots above the ground, and consequently the stumps will not get much of a check from the burning. In every case it pays to roll scrub in the proper season. Cultivating and ploughing needs a good deal of consideration to obtain the best results. Most of us use the plough at the beginning of the season, but towards the end we want to get along more quickly and the rest of the land is worked with the cultivator. This is a big mistake. If a man has any cultivating to do at all it should be done in the early part of the season. In this way a good portion of the crop can be put in early, and will be growing while the slower process of ploughing is going on. Even if the ploughing is late in finishing it is good work which will give far better results than late cultivating. Some farmers are ploughing very lightly to avoid rooting out too many stumps. This I consider a good plan. The stumps make a lot of extra work during seeding time, and could well be left over till fallowing time, when plenty of strength can be put on the plough to rip them out properly. There is also plenty of time then to pick them up. Straw-burning is an item to be well studied in this country, where we have so many mallee shoots to deal with. Straw should be burnt as soon after harvest as possible to ensure the best results. A log hung on the stripper or harvester to knock the stubble down, even though it necessitates an extra horse in the team, will more than pay for the trouble. Burning can then be done in February, and most of it completed before the early rain; consequently there will be very few shoots to cut, and this is a great saving of time. On the other hand, if you do not knock the straw down at harvest time it has to be done afterwards under more difficult conditions when the stubble is not so brittle, and in most cases the rain comes before it is finished. If the work is done methodically there will be a good spell for the horses between the seasons, and we shall have better results from our work." Members agreed with the views expressed in the paper. Some preferred ploughing to cultivating if they had time and labor to remove the stumps.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, June 21.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Lewis (chair), T., A., and J. Jacobs, Kayser, Ricks, Curnow (Hon. Sec.), and one visitor.

DRAINING LAND.—Mr. G. Ricks read a paper on this subject. To get the best results, he said, the land in this district must be drained. Open drains were continually being filled up with rubbish, and if not kept clear the water could not get away. To construct an underground drain, a good plan was to dig a trench from 2ft. 6in. to 3ft. deep and put

a good layer of 4in. stones on the bottom. Then put larger stones on these till they were a foot deep. This was covered with ti-tree or some other brush, and the soil thrown in on top. A drain made in this way three or four years ago had given every satisfaction. Wood might be used, but where plenty of stone was available he thought it best to use that. It would last a lifetime, whereas, in the course of a few years wood was destroyed by white ants and decay. Earthenware pipes were also good, but more expensive than the method described. Members all agreed that drainage was necessary wherever the winter water stagnated. Mr. T. Jacobs was in entire agreement with the paper. Mr. Lewis preferred to lean some flat stones against the walls of the drains to give a free run, he then filled in about 1ft. of smaller stones on the top. Some drains now working in his garden had been running for over 50 years. Mr. A. Jacobs had helped to put in some drains this winter with stringybark, and so far they were working well. He thought stone drains were liable to choke when near to fruit trees, owing to the roots.

FOXES.—Mr. T. Jacobs and the Hon. Secretary reported that they had successfully poisoned foxes, using sparrows and other small birds as baits. A little strychnine was put in the mouth of the bird, and the latter singed over the fire, and then buried in the fields. Some of the foxes had been poisoned with baits which had been out in the fields for over two weeks.

BIRDS AND GARDEN PESTS.—Mr. Jacobs said that while visiting a neighbor's residence he noticed that the vegetables were sickly and vermin infested. There were very few small insectivorous birds to be seen, and this was owing to the presence of a large number of cats, 11 of which were counted by himself. These animals had, without doubt, destroyed the insectivorous birds about the home, and consequently grubs of various kinds and aphides had had no check placed upon their increase.

Cherry Gardens, July 19.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Stone (chair), T. and A. Jacobs, Ricks, J. and C. Lewis, Brumby, Chapman, Kayser, H. and J. Strange, Broadbent, Curnow (Hon. Sec.), and two visitors.

ASPARAGUS-GROWING.—A paper dealing with this subject was read by Mr. Ricks. He sowed the seeds in small beds, and left the plants there till two years old. To save time, plants of this age could be purchased from a nurseryman. The permanent beds were made each 5ft. wide, with 2ft. paths between. The soil should be a rich sandy loam, thoroughly mixed with well-rotted farmyard manure, and with plenty of manure put at the bottom. In these prepared beds he set out the plants 2ft. apart, with 18in. between the rows, spreading the roots carefully, and leaving the crown of the plant 2in. below the surface. Weeds were kept down and dry stems cut off in winter, after which a dressing of salt or kainit, $\frac{1}{2}$ lb. to the square yard was applied. About 4in. of well-rotted manure was also forked in in July or August. It was not advisable to cut any heads until the second year after planting, so that the roots might first be well established. This was the only plant which, in his experience, had been free from disease. A bed in his garden, planted 27 years ago, yielded a good crop last season. He believed there would be a big demand for this vegetable as people acquired the taste. Mr. Jacobs had a bed of asparagus which was put down 60 years ago, and although sadly neglected, it still produced a few heads. Mr. Curnow thought the plant needed a liberal dressing of salt each winter and a good coating of farmyard manure forked into the ground in, say, April or May. Messrs. Strange and Ricks agreed with this opinion.

STRAWBERRY CULTURE.—Mr. Stone read a paper on this subject. He strongly advised an intending planter to carefully "count the cost" before commencing work—not merely in monetary outlay, but in proper care and treatment. Land with a good subsoil, such as a friable clay and a poor surface, was to be preferred to a good top soil with stony or gravelly soil immediately underneath. The paper continued—"In breaking up land for strawberry-growing in this district I would advocate trenching the ground by hand labor, as much of our land is heavily timbered. In trenching or breaking back I do not advocate bringing the clay or subsoil to the surface, but work to the depth required and simply stir the subsoil in the bottom, and leave it there, as it will retain the moisture much better than if placed on top. I like the ground worked to at least 14in., or better still, 18in. deep. Possibly on moderately free land this may be done with the plough and subsoiler at considerably less outlay than by hand labor. When the land is worked down to a fine tilth, work into it a good dressing of fertilisers. I prefer pure bonedust, as it has a good body, and puts heart into the land. In planting, place the plants about 1ft. apart, with 2ft. in the rows. In the spring time give a light hoeing, to kill the weeds. This also gives the surface a loose tilth or mulch, to prevent the sun from baking it, as

well as to retain all possible moisture. It may be necessary to hoe more than once in the season. Assuming that the position has something to do with the ripening of the fruit, some growers prefer their plantation to face the east, and gain the advantage of the morning sun. I know of strawberries facing the four points of the compass, but can see no difference in the crop which could be attributed to that reason. When the grower has accomplished the first year he will still find plenty of work if he would get good returns from this industry. It is undoubtedly a very risky crop to control, taking the weather, disease, birds, and insect pests into consideration; but, as with most classes of work, we cannot reasonably expect a good return unless we give the care and attention that is demanded." The paper was well discussed, and members agreed with most of the writer's views. Mr. T. Jacobs thought the Margaret variety was the most profitable in this district. The Chairman said the worst pest he had to contend with was a small cockchafer-like grub. He thought these grubs hatched into small brown beetles, which were about in swarms later in the summer. This pest destroyed the roots of the strawberry plant, which then withered and died. He would like to know a cure for it. [This beetle causes considerable trouble in many districts, but we do not know of any practicable method of combating it.—ED.] Mr. A. Jacobs also thought the Margaret was the best variety to grow, both for color and flavor; it would produce two good crops, and sometimes a third. Last summer Mr. Morgan, of Ironbank, had three profitable crops. Mr. Stone mentioned that other varieties were more in favor with the consumers, but they were not so profitable to the grower. He found his plants did well on a southern aspect, where they were sheltered from the north wind.

Clarendon, July 18.

(Average annual rainfall, 33½ in.)

PRESENT.—Messrs. Matthews (chair), Hilton, J. and L. Spencer, F. and E. Shiedow, Wright, jun. and sen., Piggott, White, A. T., A. A., and H. E. Harper, Tester, Morphet, Brooks, Spencer, Phelps (Hon. Sec.), and four visitors.

GYPSUM.—Discussion took place as to the value of gypsum in the improvement of soil, and as a grub-destroyer and disinfectant. It was decided to purchase a truckload and experiment with it.

PRODUCE IN FERTILISER BAGS.—Commenting upon the prohibition of the use of fertiliser bags for produce, members agreed that such restrictions were necessary, and were of opinion that these bags should be burnt in the paddock.

SIZE OF SACKS.—Some of the members who originally did not approve of the reduction in the size of cornsacks had learnt by experience to appreciate the smaller bag for handling, and were of opinion that similar restrictions should be made in the weight of bags of super.

FOXES AND RABBITS.—It was considered that although foxes were of value in exterminating rabbits, unless the former were kept down they would soon turn their attention to young lambs as the rabbits became scarce.

Forest Range, July 22.

(Average annual rainfall, 36 in.)

PRESENT.—Messrs. F Green (chair), A., H., and E. Green, E. and F. Rowley, Pollard, Tribe, Waters, Monks (Hon. Sec.), and two visitors.

GLUT OF APPLES.—Discussion took place on the difficulty experienced in disposing of apples in the local market. Mr. H. Green said that only a few varieties were saleable this season. Some fruits which were much sought after in other years, such as Buncombe, Ridgway's Red, and others, were not considered good enough now. Rome Beauty had to be absolutely free from scab, or would not sell at all. Mr. Waters had seen very inferior apples being sold in the market at 1s. 6d. to 2s. 6d. per case, and it was almost impossible to place better stuff at 4s. to 4s. 6d. per case. It was thought that while the taste of the general public varied from year to year, this season was a very unusual one, and it would not do to cut down trees of varieties that did not sell well at this time. Mr. E. Rowley said the trade was largely in the hands of the packers, who could do much as they chose with it. The Chairman thought the apple trade would right itself in the near future. Such a plenteous year as this had not been experienced before. Mr. Monks considered that large growers were partly responsible for the low prices ruling for apples, as they sold windfalls for about 1s. a case and glutted the market. Such stuff should be left at home for manure.

Gumeracha, July 18.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Porter (chair), Norsworthy, B., H. V., and A. W. Cornish, Stephens, Hanna, Sandercock, Kitto, and Lee (Hon. Sec.).

COST OF GROWING FARM CROPS.—The following paper on this subject was read by Mr. Hanna:—"Numerous papers have been written, recommending the farmer to grow various crops, but in very few instances can the reader obtain more than a vague idea of what it would cost to obtain the product. It is a difficult matter to give a thoroughly reliable estimate of the cost, owing to the varying conditions that prevail, all of which tend either to reduce or increase the cost of production. There are probably few farmers in this district who attempt to prepare a fair estimate of their expenditure upon the different crops grown by them. They usually base the cost upon the actual cash outlay. This method frequently enables them to show a profit, which in all probability would not have been realised had a fair charge been made for the whole of their labor and other expenses incurred in the production of the crop. The expense involved in ploughing, sowing, and harvesting a crop from similar areas of either rich or poor soil does not vary much, but the cost would increase considerably on rough and hilly farms, where in the majority of instances cereal crops are generally unprofitable. Any profit or loss that may result depends largely upon yield and prices obtained for the product. Unfortunately this cannot be regulated by the farmer in the same way as the manufacturers and other business men regulate their prices—according to the cost of the article they have to sell. Inexperienced persons usually gauge the success of the farmer upon the quantity and value of the product sold or to be sold, without fairly considering what expense has been incurred. Farmers in our northern plains and other similar country may consider the figures relating to a wheat crop for hay excessive, but a thorough acquaintance with the methods of cultivation and the nature of the land generally, I think, would remove that impression. The cost of growing the following crops will apply to the hills generally, and are based on the supposition that an individual or individuals provide the land, finds all labor, and pays all other expenses incurred in the production of the crop:—

Cost per Acre of Wheat for Hay.

"Five per cent. on value of land, 8s.; ploughing, 7s. 6d.; seed, 1½ bush. at 4s. 6d., 5s. 7d.; manure, 10wt., 5s.; drilling, 2s. 6d.; harrowing (twice), at 1s. 6d., 3s.; rolling (once), 9d.; binding crop, 3s.; twine and oil, 2s.; carting (per ton), 1s. 6d.; stooking (per ton), 1s.; stacking (per ton), 1s.; thatching (per ton), 1s.; total, £2 1s. 10d. Depreciation, wear and tear, &c., is omitted. The yield is estimated at a low average of one ton per acre; two, three, or four tons per acre would increase the cost of harvesting the crop considerably. When the whole of this work is done by the farmer and his family his actual expenditure would be about 20s. or 25s. per acre.

Pea Crop.

"The difference between the cost of growing this crop and the preceding one would be an additional 5s. per acre for seed and 2s. 6d. per acre for manure; a total expenditure of £2 9s. 4d. per acre. When the land will permit the use of a double-furrow plough, 5s. per acre should cover the cost of ploughing.

Rape.

"To thoroughly prepare the land for this crop, purchase seed, manure, and sow the crop will cost 25s. per acre. If the farmer does not include the value of his labor his expenditure would amount to 14s. or 15s. per acre. This, of course, will vary according to the nature and value of the land, &c.

Mangolds.

"Deep cultivation, thoroughly worked, and heavily-manured land is required to grow this crop successfully. Farmyard manure, 16 tons at 2s. 6d. per acre, £2; two ploughings, 15s.; four harrowings, 6s.; two cultivatings, 4s.; two rollings, 2s.; dibbling plants, £1 5s.; two scuffings, 8s.; seed, 5s.; 5 per cent. on value of land, 10s.; total, £5 15s.

Planting Orchard.

"Five per cent. on value of land, 8s. per acre; two ploughings, 15s.; three harrowings, 4s. 6d.; two rollings, 1s. 6d.; two cultivatings, 4s.; 100 trees, £3; planting same, £1 5s.; 1½wt. No. 8 wire, 13s.; 286yds. wire netting, £2 19s. 6d.; 86 posts, at 6d. each (10ft. apart), £2 3s.; erecting same, £1 1s. 6d.; straining wire and erecting netting, £1 1s. 6d.; total, £13 16s. 6d. The following year, interest, cultivating, pruning, &c., would cost 25s. per acre. This amount would increase, say, 2s. 6d. per acre annually for seven years, bringing the total cost up to £24 4s. per acre before any return was obtained from the orchard. The cost per acre for fencing 10 acres would be 50 per cent.

less than the amount required to fence one acre: other expenses would also be a trifle less. My estimate for posts is based on the supposition that they could be obtained on land adjoining, or near to the orchard. That the land intended for planting is fairly even, that no expense had been incurred in clearing or preparing it for the plough. On heavily timbered or rough hilly land the cost of planting an orchard would be much higher than my estimate. On the whole I have endeavored to underestimate the cost of growing the crops, &c., referred to in this paper." In the discussion which followed, Mr. Norsworthy and others said the land must produce more than one ton of hay per acre to pay expenses. He thought it would not pay to grow hay in this district in these seasons, as only when drought prevailed in other parts of the State did farmers receive good prices. He thought Mr. Hanna's value of land for growing mangolds was low. The very best land was necessary to grow this crop. Mr. B. Cornish said that with the pea crop the threshing was the trouble. Peas were a very uncertain crop. He had sown early and had a failure, and had sown late and secured a good crop. He believed in stacking and feeding peas to pigs in the straw. One bushel fed that way was equal to 2bush. clean. He did not think it paid to grow rape here. Land for this crop should be ploughed early, and kept loose. Mr. H. V. Cornish thought it useless to grow hay in this district. He had grown hay on land which in the preceding year had been cropped with peas, with 2cwts. bonedust to the acre, and was out of pocket over it, although feed grew in abundance afterwards. Farmers here could not compete with the man on the plain country with his five-furrow plough. Mr. Sanderoock had grown crops in an orchard, and had good returns, without waiting for seven years. Mr. Kitto thought growing crops at the cost quoted in the paper would not pay. Mr. A. W. Cornish considered £13 an acre for planting fruit trees too high, although much depended on the country. If there were large gum trees to grub it made the expenses much higher. Mr. Porter thought the writer was not far out in his figures. It was expensive to farm in the hills. He had had experience in plain country where, with eight-furrow ploughs, the cost of working land was much less. Mr. Hanna, in reply, said if the work of farm and orchard could be done without employing outside labor the cost would be about half. He thought the cost of harvesting a pea crop about same as for cereal hay. For growing rape the ground should be worked to a very fine tilth.

Hartley, July 16.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Wundersitz (chair), W. and C. Brook, G. and T. Phillips, Paech, Pratt, Stanton, Hudd, Tydeman, O. Wundersitz, Birmingham (Hon. Sec.), and one visitor.

EARLY v. LATE FALLOW.—Considerable discussion on this subject took place. Members were principally in favor of early fallow, especially on stiff land. If this class of soil was left late, unfavorable weather might set in and make it difficult to fallow at all. They would start as soon as possible after seeding, and plough 5in. deep. Some advised harrowing at once, while others thought it better to leave it for two or three weeks, to let the sun get at it. They considered it should be cultivated fairly deeply in September, and not merely scratched over the surface. Light sandy soil they would fallow later, and would not work it very much, as otherwise it might drift during the summer.

Longwood, July 23.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes (chair), Glyde, Pritchard, Roebuck, Furniss, Oinn, Doley, Coles (Hon. Sec.), and three visitors.

PRESERVATION OF CEMENT TANKS.—For the preservation of tanks or water-proofing or walls a coat of tar with river sand sprinkled on, repeated three times, was recommended.

SPRAYS.—An address on the use of scalecide was delivered by Mr. Townsend, who said the preparation should be used three times during winter and spring. Spray should always be applied from above the tree if possible.

BITTER PIT.—It was suggested that if, when pruning in winter, only alternate limbs were cut, i.e., pruning half the tree each year, the extra wood might possibly use up the excess of sap and result in healthier fruit. A member wished to know whether the Winter Majetin was at all subject to bitter pit. [Will some of our growers please reply.—Ed.]

BANDAGES.—It was suggested that bandages from apple trees might be tightly rolled up and placed in the forks of the trees and then gathered up in a sack and boiled, after

which they could be used again. Paper bandages could be used and then destroyed by fire.

EXHIBITS.—The following apples were tabled:—Rother's Winter, Ling's Seedling, Yates, Nickajack, and Gregory's Pomeroy—a similar fruit to Cleopatra, but not subject to bitter pit. All these were in perfect condition.

Meadows, July 18.

(Average annual rainfall, 34½ in.)

PRESENT.—Messrs. Ellis (chair), Brooks, Griggs, W. J. and (i. R. Stone, Smith, Catt, Nottage, Morriss, Kleeman, Nicholle, Bertram (Hon. Sec.), and one visitor.

TREATMENT OF SOILS WITH HEAVY RAINFALL.—Mr. Smith read a paper dealing with the treatment of local soils. "Soils," he said, "were principally composed of sand clay, and lime, and their fertility depended largely upon the amount of organic matter which they contained. Although the subsoil alone, in its uncultivated state, might not be able to support rigorous vegetable life, it was desirable to make that subsoil accessible to the roots of various kinds of plants which needed to draw moisture from it during the dry season of the year. Where the subsoil was of a sandy or pebbly nature, and had a reasonable fall or slope, the surplus water precipitated during winter would drain away; but if the subsoil was of clay the water was held, and vegetation—other than that which was purely surface-feeding—fared very badly. For vegetable-growing the drainage should be arranged to bring the water-table at least 18 in. below the surface, as the tap-root of a large percentage of vegetables reached that depth. For fruit trees the drainage had to be 3 ft. deep. In this cold district, with an average annual rainfall of 34 in., much more manure was required to keep the soil rich and warm than was necessary in warmer parts of the State. The rain washed a good deal of plant food out of the soil, especially on the hill-sides, and this had to be replaced if good crops were to be realised. He thought it very advisable to supply top dressings of stable manure in winter. Although this introduced seeds of weeds, and harbored slugs and other pests, the labor involved in killing these was amply repaid in the results obtained. Care was necessary to avoid burning the stems of plants and causing collar-rot. The manure should be turned under before the hot weather set in, particularly where the land was not irrigated. Commercial fertilisers were of great value in growing seeds such as onions and carrots, which could not safely be covered with stable manure. In the summer months a fine mulch of earth or straw, leaves, &c., must cover the surface of the soil, or evaporation would take place so rapidly that promising crops would fail from lack of moisture."

EXPORTING APPLES.—Mr. Griggs reported that he had this year exported 250 cases of apples of different varieties, and the return only averaged 2s. 4d. per case net; 25 cases sent to Java cleared 5s. 2d. per case net, which was as much as he cleared on about 50 cases of similar fruit sent to London. Wellingtons and Jonathans brought 10s. 6d. per case, while Emperors, Mob's Royal, and Reinettes only averaged about 2s. 6d. per case. He did not intend to export any of the last three varieties of apples again.

Port Elliot, July 16.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. Chibnall (chair), Brown, Welch, Barton, Pannel, Green, sen., W. E. and W. W. Hargraves (Hon. Sec.)

HOW TO CLEAR FERN COUNTRY.—Mr. Burton read a paper on this subject. He thought it was not generally known that pigs were great exterminators of ferns. He had a few acres of fern country which he had tried unsuccessfully to clear. Acting upon the advice of a farmer at Encounter Bay he turned some breeding sows into it, and they were doing good work. They would burrow down about 2 ft. 6 in. for the fern roots, of which there were two kinds. The white roots contained a cream-like fluid and the black ones a substance like sago, and the pigs devoured these long roots just as they would a mangold. His method was to fence off half an acre at a time. The posts were put 10 ft. apart; one barbed wire was put along on the surface of the soil and another 6 in. above it, while a plain wire on top secured the 3 ft. wire netting. He considered this fern country would profitably support pigs while they improved it in several ways. Melons had done well on land cleared in this way, and he now intended to try lucerne and rye. Several of those present had found that pigs did good work in clearing out ferns. Mr. Brown had successfully grown *paspalum* on this class of land. It did well when once it got a start. Mr. Welch killed off ferns with applications of salt.

MALLEE SHOOT.—Members agreed that the best time to cut mallee shoots was from November to March, while the sap was up. Mr. McLeod found it best to knock them off with an old axe. This was slower work than using the shoot cutter, but was more effective in checking the growth of shoots.

Uraidla and Summertown, July 12.

(Average annual rainfall, 42½ in.)

PRESENT.—Messrs. Collins (chair), Day, Hawke, G. F. and H. F. Johnson, Hart, Moulds, Dyer, F., Y., and R. N. Cobblestick, Prentice, Surlt (Hon. Sec.), and two visitors.

WISE PRODUCTION AND METHODICAL MARKETING.—The Chairman read a paper to the following effect:—He had observed that as a general rule when the market was well supplied with certain rural products others were scarce, and as the supply and demand governed the prices to be obtained, he thought it wise to produce as wide a range of necessities as could be profitably accomplished. Some of the gardens in this district seemed more suited to vegetable-growing than anything else. They had good water supplies, and the soil could be ploughed instead of it being necessary to dig it all. The man whose garden was close to the main road had a distinct advantage in the matter of manure supply over the grower who was situated farther back. The latter, however, was better placed in regard to the comparative freedom from frost, and had sheltered gullies for raspberries and currants, while on the hillsides strawberries and gooseberries grew to perfection. Apples, pears, and some stone fruits ripened and colored well, and had a much better flavor than that which was grown on the lower land. Neither were fungus pests so troublesome in these warmer places. To add something to vegetable or fruit production, and also to turn to profit waste products, cows and pigs could be kept. If fallen apples were picked up and fed to pigs, a good deal of codlin moth would be destroyed. He always had the apples picked up, and all those that were fit were boiled with waste potatoes and fed to the pigs with pollard. Even with a limited amount of room available, sufficient poultry could be kept to supply the household with eggs. Bees he found in some years did very well, while in others they made comparatively little honey. He would like some practical hints on beekeeping. [Two or three excellent articles on this subject have been published in the *Journal* during the past few months.—ED.] The practice adopted by some growers of taking, say, a load of turnips to market, was very detrimental to the gardeners. When the market was glutted in this way the purchaser instead of the seller, fixed the price, and it was usually a very low one. They should only take to the market a fair and sufficient quantity, and leave the rest at home for the pigs and cows. The market would not then be glutted.

Woodside, July 13.

(Average annual rainfall, 31 in.)

PRESENT.—Messrs. Fowler (chair), Moore, Kleinschmidt, Rollbusch, Drummond, King, Keddie, Johnston, Hughes (Hon. Sec.), and several visitors.

CARE OF FARM HORSES.—A paper dealing with the treatment of horses was read by the Hon. Secretary. During harvest time in this district the horses required very little more feed than they could pick up in the paddocks. At seeding time and whenever necessary to feed them, he gave them long hay when going into the stable in the evening. The hay should be loose in preference to sheaves, to avoid waste. At eight o'clock he followed this with about two kerosine tins of good chaff to each draught horse, or less in proportion to the size of the animal. Some horses would keep on eating so long as there was food in the manger, but they were better with only sufficient food for their need, as they then had more rest. The digestive organs of the horse, although rapid in action, should not be overtaxed. In the morning he mixed some bran and oats with the chaff. Oats, he considered, could not be surpassed for horses by any other grain. The morning meal should be given early enough to leave two hours before going to work. At dinnertime a similar meal was given, with an extra allowance of oats if the horses were working very hard. He had found wheaten hay chaff more acceptable to his horses than oaten, but thought the explanation was that in this district principally Algerian oats were grown, and unless these were allowed to get nearly ripe the stem was very bitter. Consequently the straw was very light and dry, and the horses tossed it about in their attempts to get the oats. Cape oats made the best of horsefeed, but it was not easy to get a good

crop of this variety in this district. His horses were always allowed to go straight to water from the plough, regardless of how hot they might be. They were also watered before their breakfast and at mid-day. It was surprising how much horses benefited from being cleaned down at night. In the general discussion which followed some members were not in favor of feeding long hay to horses, as this was responsible for a considerable amount of waste.

SOUTH-EAST DISTRICT.

Kalangadoo, July 9.

PRESENT.—Messrs. Crouch (chair), Gibb, Hemmings, Kennedy, Tucker, Earle, J. and R. Boyce, Bennett, Guerin, McCall, Mitchell, and Sudholz (Hon. Sec.).

HORSES FOR FARM WORK.—A paper on this subject was read by Mr. Earle. As the result of several years' experience he had come to the conclusion that the medium draught was by far the most suitable animal for districts similar to this. They travelled better, and did more work than the heavier breeds, and they did not get leg-tired so easily. Less food was required to keep them in condition, and this was a great consideration. Neglect or bad treatment of horses resulted in less work being done and the shortening of the animal's lives by several years. Instead of being done for at 15 years, horses should be good workers at 20 or even 24 years. It was a great mistake to overwork horses. Records were sometimes made in ploughing large areas between daylight and dark, but frequently at serious cost to the horses. Any man who worked a horse with sore shoulders should be prosecuted. Hard and illfitting collars were responsible for sore shoulders. Young horses should be watched carefully for any signs of sore shoulders. Feeding should be attended to at regular intervals, and as far as possible just as much as was required for a meal should be given. Horses should not be subjected to extremes of heat or cold when feeding. In discussing the paper, the Chairman recommended sponging with a lotion of sugar of lead and water for sore shoulders.

Millicent, July 12.

(Average annual rainfall, 28½in.)

PRESENT.—Messrs. Stewart (chair), Harris, Holzgrefe, Mullins, Serle, Day, Hart, Mutton, and Thompson (Hon. Sec.).

GARDENING.—Mr. Mutton read an interesting paper on gardening. Having spoken of the value of the Bureau system of this State in the free exchange of agricultural knowledge, he proceeded to deal with gardening on several classes of soils as follows:—"The peat and shell land is easily worked after being once broken up, but is liable to become too loose. This kind of land will grow nearly every vegetable which is not subject to frost—cabbage, cauliflower, carrot, beet, parsnip, pumpkin, melon, &c., and with a moderate amount of manure, will produce a paying crop. The greatest drawback to producing on the Wylie land is the want of protection from winds and frost. The heavy clay soil I consider to be the richest we have to deal with, and with protection from winds and frost any vegetable can be grown. The black sandy land takes a lot of manure, but is easily worked, which makes up for the extra manure. Having been for four years almost constantly growing vegetables for the Millicent market and attending Bureau meetings, I have learnt a good deal. When I first started I went in for growing large vegetables, but found this to be a mistake, as the people generally would rather have the smaller vegetables. To grow large vegetables they must be given plenty of room. It does not do to manure too heavily for vegetables, as it will take the solidity from them, and, when cooked, they will not have a pleasant taste. I have heard people say that you cannot put too much manure on the land, but from this view I must differ. I once saw a plot of ground very heavily manured for potatoes with stable manure. They were all tops and no tubers, and the ground was covered with weeds and stinging nettles. But the following year, when the ground was put in with potatoes without manure, it produced a good crop. The manuring of the land is one of the secrets of gardening. You

have to find out what plants require much manure, and those that require very little. Tomatoes require little manure; with heavy manures you will be liable to get all tops and no fruit. Cauliflowers and cabbages are likely to run up and go to seed. In fact, most vegetables do far better with only a fair amount of manure. As to the kind of manure, I am beginning to find that supers are better than yard manure, for two reasons: First, supers are cheaper; and secondly, you do not get the weed with the super, as you do with the yard manure. One great drawback in growing vegetables all the year round in this district is the long, cold, and wet winters that we have. The only remedy we have is to plant in late summer months or early autumn. Of course, this requires irrigation to start and keep the plants going until the first rains. Another drawback is the insect pests—cabbage aphid in summer and slugs in winter. I find lime to be the cheapest, and, with constant use, the best remedy for any pest that comes in my garden. Those who have to buy seed have yet another drawback, for you cannot always depend on the seed you buy. I am growing for myself, onion, carrot, parsnip, lettuce, tomato, and beet seed; and since I have been growing these seeds they never fail to produce. I find that drilling in the seed is better than broadcasting. They come up better and the weeding is much easier. The amateur gardener who has no seed drill may make a rammer of a piece of 3in. x 2in. timber 3ft. long. Bore a hole in the centre of the 2in. side and insert a handle. With this you can make the seed bed in the drill and be more sure of the seed coming up. For small seed, such as onions and lettuce, ram very lightly, then rake over. For larger seeds, such as French beans, peas, &c., hoe the drill out about 2in. deep, then ram hard in the drill, and you will be more sure of your seed coming up than by drilling in the loose ground. The time is drawing near when you will be able to sow and plant your vegetables. What you plant in the first week of August will do much better than what you plant this month. Dig deep, keep the ground loose; in dry weather water well, and if you have water laid on so that you can use the sprinkler, do not be afraid to water on the hottest day you have. Of all the occupations one can have I think gardening is the best, for with the aid of experience and the information we get at our meetings we can always be learning and improving for the benefit of ourselves and our fellows." Mr. Mutton said further that if he were to divulge how much he made from his little garden during one year many people would not believe him. Yet he lived almost entirely on the produce of the garden. He knew a man who obtained £200 from the sale of tomatoes grown on a quarter of an acre. If he could sell all the tomatoes he could grow in his garden at 1d. per pound he would never grow anything else.

Mount Gambler, July 19.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Sassanowsky (chair), Watson, Major, Ruwoldt, Wheeler, Pritchard, Buck, Innes, Mitchell, Schlegel, G. and D. A. Collins (Hon. Sec.).

POTATO-GROWING EXPERIMENTS.—Reports were presented on the experiments which had been carried out for the Department of Agriculture. Mr. Ruwoldt said that in his case the dry weather following the heavy March rains dried up the potatoes, and spoiled the results absolutely. Mr. Holding reported as follows:—Manure test, half-acre plot.—No. 1—Stable manure, five good dray loads to the plot; 3,150lbs. of large and 862lbs. of small potatoes. No. 2—No manure; 1,920lbs. large, 750lbs. small. No. 3—Superphosphate, 1cwt.; 2,775lbs. large, 675lbs. small. No. 4—Super. 1cwt. and potash ½cwt. mixed; 2,773lbs. large, 600lbs. small. No. 5—Super. 1cwt., potash ½cwt.; blood manure, ½cwt. per plot; 2,146lbs. large, 605lbs. small. No. 6—Super. 1cwt., potash ½cwt., nitrate of soda ½cwt.; 3,000lbs. large, 600lbs. small. The tops of plot No. 1 looked the best all through. The soil was sandy with clay subsoil, and was fairly moist. The Chairman said that Mr. R. Smith had conducted an experiment to determine whether local or imported seed would do better. He tried it with Snowflakes, and the Victorian seed had produced double the crop that the local seed had. His own experiments had also been conducted to show the effect of a change of seed only. The soil was a heavy loam with clay subsoil, and the results were as follows:—Brown's River—Victorian seed yielded at the rate of four and three-quarter tons per acre; local seed, two and one-twelfth tons per acre. Snowflakes—Victorian seed yielded at the rate of five and one-quarter tons per acre; Rendelsham seed, four and three-quarter tons per acre; local seed, three and one-half tons per acre. A plot of Gem of the South was practically a failure. Taking the Brown's River experiments right through, he did not think it would pay to go back to them. The Rendelsham seed was from the peat land. It would be seen that the change of seed made a difference for the better of nearly two

tons to the acre. According to the price this season it would have paid handsomely to have imported the whole of the seed from another district. Mr. Innes said several farmers had procured seed from Rendelsham, and in every instance the result was far better than from local seed. In one or two cases the yield was double. Mr. A. McArthur had a return of eight to nine tons per acre from Rendelsham seed. Several others used imported seed, and in every instance the yield had been much better than from local seed. Even seed from so near a distance as Glencoe, Rendelsham, and Millicent yielded better—much more than that from Warrnambool. Mr. Kilsby's report was as follows:—Moorak land, black loam, change of seed tests: Snowflake—Melbourne seed—Area, nine and a half square chains; yield, 3 tons 3cwt. big, 11cwt. small. Local seed—10 square chains; yield, 1 ton 10cwt. big, 11cwt. small. Manure tests, half-acre plots.—No. 1—Five loads farmyard manure; seven bags big, five bags small. No. 2—No manure; seven bags big, four do. small. No. 3—Superphosphate, 1cwt.; six and a half bags big, three do. small. No. 4—Super. 1cwt., potash $\frac{1}{2}$ cwt.; five bags big, three and a half do. small. No. 5—Super. 1cwt., potash $\frac{1}{2}$ cwt., blood manure $\frac{1}{2}$ cwt.; 10 bags big, four and a half do. small. No. 6—Super. 1cwt., potash $\frac{1}{2}$ cwt., nitrate of soda $\frac{1}{2}$ cwt.; six bags big, four and a half do. small. Mr. Buck had procured his seed from Glencoe this year, and thought it would pay others to do likewise.

IRISH BLIGHT.—The Chairman said it would be necessary to guard against the occurrence of potato blight. It had been suggested that townspeople and others should refrain from planting small plots of potatoes very early in the winter, because at that time there was more danger of blight. He thought the advice sound. It would be a great calamity if, because of one of these small garden plots, the district were quarantined. It would be a good thing if very early planting were stopped. The quality of such potatoes was very poor. He thought the prizes for early potatoes should be cut out of the show prize-list. It was carried as a recommendation from the Branch to townspeople and others not to plant potatoes before the middle of July.

WHEAT AT MARCH SHOW.—In regard to the poor exhibit of wheat at the Adelaide Show, the Chairman said the South-Eastern wheatgrowers could not compete in wheat with the Branches further north, as their grain was not heavy enough.

Naracoorte, July 9.

(Average annual rainfall, 22in.)

PRESENT.—MRS. COE (chair), Forster, Langeludecke, sen., Bray, Caldwell, Williams, and Schinckel (Hon. Sec.)

WHEAT AT MARCH SHOW.—Having discussed the question of the lack of interest displayed by wheatgrowers in the exhibiting of samples of grain, members stated that while the South-East growers could obtain excellent crops they could not compete with northern districts owing to the more favorable climatic conditions the latter had for raising heavier grain. The South-East had too much moisture to raise such good quality wheat.

A USEFUL PASTIME.—Mr. C. Bray showed specimens of rope which he had made from binder twine, and explained how it was made. It was a good way of using up the binder twine, and the rope was very handy for many things on the farm. It was a profitable recreation indoors on wet days when no work could be done outside. The rope was much admired for its quality.

ANNUAL REPORT.—The Hon. Secretary reported that seven meetings had been held, with an average attendance of nearly seven members. Only one paper had been read during the year. It was hoped that determined efforts would be made to revivify the Branch.

Tatlarra, June 25.

(Average annual rainfall, 19 $\frac{1}{2}$ in.)

PRESENT.—MRS. SAXON (chair), Milne, Prescott, Wilson, Stanton, O'Shea, Duncan, Fisher, and Truman (Hon. Sec.)

ANNUAL MEETING.—The Hon. Secretary reported that 12 meetings had been held, with an average attendance of 11 members. Good work had marked the year, including the establishment of an egg circle. Members of this were more than satisfied, as they realised from 1d. to 1 $\frac{1}{2}$ d. more per dozen for eggs than they could obtain elsewhere.

WHEAT AT MARCH SHOW.—In order to secure a creditable exhibit of wheat at the March show, a committee was appointed to endeavor to obtain entries representative of the district.

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J. P. WILSON,
Minister of Agriculture.

POINTS FOR PRODUCERS.

Fruit from Mildura.

The Horticultural Instructor (Mr. G. Quinn) writes—"The secretary of the Mildura Fruit Packing Union recently wrote seeking information respecting the introduction of fruit into South Australia *via* the River Murray. At present the regulations only permit of the introduction of fruits and plants into South Australia at Serviceton by rail, and at Adelaide by parcel post, and at Port Adelaide by water. At the conference of the Ministers of Agriculture, held a little over a year ago in Melbourne, however, it was decided that whenever two States wished to make a new place of entry for fruits and plants into their territory they should arrange for an inspector to be stationed there, the expense to be borne by the States in question."

Currants and Raisins from the Far North.

At a recent meeting of the Hookina Agricultural Bureau Mr. H. Hentschke, one of the members, tabled samples of currants and raisins produced on his farm. He mentioned that he was not an expert at fruit-drying and wished to have a report from the department. The samples were shown to Mr. S. McIntosh without any indication of the locality in which they were produced, and his remarks were, "The currants are a champion sample—better than the prize currants at the Mid-Murray Show; the raisins are very good Lexias." The samples reflect great credit on Mr. Hentschke, the currants especially being full of body and flavor. They were packed just at the right stage of the drying process—a point where the amateur is most likely to make a mistake.

Cottony Cushion Scale (*Icerya Purchasi*).

The Horticultural Instructor (Mr. G. Quinn) writes—"On several occasions recently samples of orange branches have been sent to the department bearing specimens of the cottony cushion scale upon them, and the senders have been more or less alarmed at the presence of this apparently rare insect. They have been assured, however, that this particular scale, which created such devastation in the citrus growths of California and Cape Colony, never rises to prominence as a pest here. It is kept in subjection by its natural enemies, chief among which is the small ladybird beetle (*Vedalia cardinalis*), and in consequence no artificial measures to repress it are necessary."

Cape Barley for Green Feed.

Mr. Frank Quire, of Wolseley, writes as follows :—" I have seen in the July number of the *Journal of Agriculture* an account of feeding-off experiments and as I have been feeding-off a six-acre plot of Cape Barley, I thought it may be interesting to readers of your *Journal* if you would insert the following :—On March 15th, 1910, I broadcasted six acres of Cape Barley and ploughed it in *without manure* on sandy land. On June 20th I put 80 Merino ewes with 70 lambs on it, and on June 23rd I put 80 more 4-tooths on it and left the whole lot of 230 on it until the 2nd of July, when I shut all stock off of it till August 8th, when I put 14 head of horses and 4 head of cattle on it until August 26th, when I took all the stock off of it and harrowed it twice over to freshen it up. If it will be of any interest to you or your readers, I can let you know how much more this six-acre plot will stand feeding during the year." The above is exceedingly interesting, and indicates what can be done to provide feed for stock during the winter and at the same time give the natural pasture a spell. Allowing each horse and cattle to be equivalent to six sheep, and making no allowance for the lambs, this is equivalent to carrying two sheep to the acre for the whole year. We will be interested to know the result of the crop on this plot. Under ordinary circumstances it could either be fed down again about the end of September or left for grain.

Spring Cultivation in the Orchard.

The Horticultural Instructor (Mr. G. Quinn) writes—" In regard to ploughing at this time of the year, a drying wind will cause many soils to crust within a few hours, consequently it is desirable each day to harrow or cultivate lightly over the surface of the land which has been ploughed. Of course this is not necessary in showery, cool weather, but it is always a safeguard against the crusting of the soil, and causes a proper soil mulch to be formed. This practice also assists to conserve moisture which would have been dissipated by the spring ploughing. Wherever it is practicable two ploughings in an orchard are often desirable, even although they follow almost straight upon each other. The second ploughing should be applied in a diagonal or cross direction to the first, with a view to cutting out the strips left between the trees."

Tests with Arsenate of Lead.

It has been decided to continue the testing of lead arsenates for the destruction of codlin moth at the orchard of Mr. H. Kennedy, near Lyndoch. This gentleman has again kindly placed his plantation at the disposal of the department. The apple trees have been carefully thinned out to permit of

the work being done effectively, and Mr. Kennedy has agreed to attend to the cultivation of the soil during the season. Several brands of lead arsenate at present on the local market will be tried side by side, and an accurate account of the results will be kept. The trees will also be sprayed with copper compounds, with a view to the prevention of black spot, and it is possible that a comparative test of the normal Bordeaux mixture and the Bordeaux pastes will be made. This spraying will be done just at the time the buds burst, but the spraying with the lead arsenates will not be commenced until the blossoms are falling from the trees, which will probably be well into October.

Green Manures.

The Horticultural Instructor (Mr. G. Quinn) writes—"Most orchardists are now busy ploughing their orchards, and they are turning under in many cases great masses of dandelions which have grown on the land. These, however are poor soil makers, affording a very small amount of humus when the water is expressed out of the plants. There is an idea that they are valuable for inducing organic matter into the soil, but the quantity is very little compared to what might be produced from the growth of such crops as peas, tares, or lupines. Wherever any of these have been sown for green manuring purposes, and irrigation is not practised, it is desirable to turn them under at the first opportunity. The common practice in Victoria has been to roll down the green crops in front of the plough, taking great care not to roll more than can be ploughed in within a very short space of time, because if the plants turn upwards again they appear to be much more difficult to cover in than if turned over in the flattened position. By means of a disc coulter and a drag chain very little is left on the surface where rolling is practised, although the crop may be above the knees of a man. It should be remembered that those crops to yield the best results must be turned under whilst there is abundance of moisture in the soil so that they may pass through the first stage of decomposition before the land becomes dry."

Diseases of Bees.

On application to the Department of Agriculture arrangements will be made for the Inspector of Bee Diseases to make free microscopical and anatomical dissections of the contents of combs containing suspected disease. The following conditions should be observed:—(1) The portion of comb forwarded should be about 3in. or 4in. square, containing the undisturbed remains of the dead larvæ; (2) it should be packed in a tin box, or some receptacle that will not crush in the post; (3) cut away all comb containing liquid honey unless sent in a watertight package. Beekeepers are requested for the general welfare of the industry to report the appearance of bee diseases

in their districts. Subsequent investigations in conjunction with the bee-keepers concerned will greatly assist to prevent the spread of disease. Owing to the mortality caused in neighboring States by the presence of dysenteric disease amongst bees, beekeepers are asked to carefully watch any cases of virulent dysentery and communicate their observations to the Department.

Spraying Peach and Apricot Trees.

The Horticultural Instructor (Mr. G. Quinn) writes—"When the flower buds on the peach and apricot trees have burst spraying with copper compounds should be prosecuted without delay. It is quite useless to spray peach trees to prevent the curl leaf fungus after the leaves have begun to emerge from the buds. The importance of spraying in connection with the apricot is not so vital, but at the same time the restriction of the shothole fungus is best begun by spraying when the buds are opening, although later sprayings after the fruits have formed are extremely valuable, more particularly in damp, misty localities. There are several brands of ready made Bordeaux mixture under the name of Bordeaux paste on the market, and should these prove as efficacious as the ordinary Bordeaux mixture the ease with which they may be brought into a condition for application should commend them to the average fruitgrower. A comparative test on peach trees with respect to curl leaf fungus is being carried on in the Government orchard at Coromandel Valley, and in a few weeks we shall be able to make a comparison between the efficacy of the various brands."

The Smuts of Australia.

"The Smuts of Australia: their Structure, Life History, Treatment, and Classification" represents another valuable contribution by Mr. D. McAlpine (Vegetable Pathologist to the Department of Agriculture of Victoria) to the literature on plant diseases. This volume consists of nearly 300 pages and over 300 illustrations, and deals with the various fungus diseases known under the general name of "smuts" from both the scientific and the practical standpoints. The numerous photomicrographs will be of great value to the scientist, while the chapters which deal with the life histories and treatment of the different smuts will prove extremely useful to practical farmers. This book is issued by the Victorian Department of Agriculture at a charge of 4s. per copy, postage 9d. extra. The following cereal smuts are described at length:—"Stinking Smut or Bunt in Wheat," "Loose Smut of Wheat," "Flag Smut of Wheat," "Loose Smut of Oats," "Naked Smut of Barley," "Covered Smut of Barley," "Head Smut of Maize," and "American Corn Smut." The smuts affecting sorghum, brome grass, kangaroo grass, and barley

grass are also illustrated and described. Mr. McAlpine mentions that altogether 68 species of smuts have been found in Australia, many of which are in all probability indigenous to the Commonwealth. Dealing with the question of immunity of certain wheats to stinking smut or bunt, mention is made of the experiments of Messrs. Farrer and Sutton in New South Wales and Pye in Victoria to produce "bunt-proof" wheats. These experiments were begun by the late Mr. Farrer in 1901, and, although it cannot yet be said that "bunt-proof" wheats have been produced, a number of crosses made by Mr. Pye, of Dookie Agricultural College, in which *Medea* is the parent, are very promising, and there is reason to anticipate good results from these strains.

Power Spraying Outfits.

The importance of saving time in the application of sprays to our fruit trees is being gradually forced upon the owners of large orchards, and a number of power sprays are now being put into use. Most of these sprays are made either in South Australia or the adjoining States, and it can safely be prophesied that within the next few years every orchardist possessing 20 or more acres of trees subject to different pests will be found utilising this very effective means of applying a large quantity of spray in a very little time. With these instruments both increased strength and continuity of pressure can be maintained by means of the motor power.

Imports and Exports of Fruits and Plants.

During the month of August 5,941bush. of fresh fruits, 129pkgs. of plants, and 3,113 bags of potatoes were inspected and admitted at Adelaide and Port Adelaide, while 825 bags of potatoes were passed at Serviceton under the Vine, Fruit, and Vegetable Protection Act; 82bush. of fresh fruits (chiefly over-ripe bananas) were rejected and destroyed. The exports to inter-State markets examined at Adelaide comprised 10,209bush. of fresh fruits, 3,302pkgs. of vegetables, and 145pkgs. of plants. In addition 574bush. of fresh fruits were inspected and passed for inter-State markets at Renmark, 157bush. of fresh fruits at Gawler, 25bush. of fresh fruits, 360 bags of potatoes, and 96 bags of onions at Coonawarra. Under the Commerce Act 826 cases of fresh fruits, 82pkgs. preserved fruits, 371pkgs. dried fruits, and 1pkg. of honey were exported to oversea markets during the same period. These were distributed as follows:—For London, 37 cases oranges; for South Africa, 331pkgs. dried fruit; for New Zealand, 423 cases oranges, 160 cases lemons, and 40pkgs. dried fruits; for Hamburg, 16 cases oranges; for India and East, 189 cases apples, 1 case oranges, 82pkgs. preserved fruit, and 1pkg. honey. Under the Federal Quarantine Act 2,154pkgs. of plants, seeds, bulbs, &c., were admitted from oversea sources.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

FEEDING VALUES OF PERENNIAL RYE GRASS AND COCKSFOOT.

"Glenavon" writes—"Will you kindly answer the following questions in the *Journal of Agriculture*.—1. Are perennial rye and cocksfoot grasses considered to be of a high feed value, and what are the percentages? 2. How many pounds to the acre should be sown of each grass for pasture? 3. How many pounds of perennial rye or cocksfoot go to the bushel? 4. Can these grasses be reaped with an ordinary stripper? If so, what alterations, if any, are necessary? 5. How many pounds in one cubic yard of hay chaff?

The Director Experimental Agriculture (Mr. Angus) replies—"1. Perennial rye and cocksfoot are considered to be of good feeding value. Some idea of their respective values will be gleaned from the following analyses:—

	Perennial Rye.		Cocksfoot.	
	Grass in Natural State.	Dried at 212° Fahr.	Grass in Natural State.	Dried at 212° Fahr.
Water	62.01	—	60.74	—
Soluble albuminoids .....	.38	1.00	.25	.62
Insoluble albuminoids	2.06	5.38	1.50	3.81
Digestible fibre	7.98	21.01	11.30	28.78
Woody fibre	17.71	46.62	16.24	41.36
Soluble mineral matter	2.90	7.64	2.04	5.19
Insoluble mineral matter .....	.78	2.05	.91	2.32
Chlorophyll, soluble carbohy- drates, &c.	6.18	16.30	7.02	17.92
	100.00	100.00	100.00	100.00

"The following table will enable a comparison to be made between (1) perennial-rye (a) as forage, (b) as hay, (2) rich natural pasture, and (3) oaten hay :—

	Digestive Matter.			Organic Matter.
	Albumi- noids.	Fats.	Carbo- hydrates.	
1. Perennial rye—				
(a) As forage	1.8	0.3	12.2	28.0
(b) As hay	5.1	0.8	35.3	79.2
2. Rich natural pasture	3.1	0.4	10.8	19.6
3. Oaten hay	7.2	1.1	35.9	78.8

"(2) From 1bush. to 1½bush. when sown alone; when sown with other grasses from 22lbs. to 26lbs. per acre. (3) Perennial rye contains 28lbs. per bushel (96 per cent. germination), and cocksfoot 22lbs. per bushel (95 per cent. germination). (4) Yes, most ordinary strippers can be used for this work. One manufacturer, at least (Mr. J. F. Mellor), makes a special comb for stripping grasses. (5) The weight is dependent upon so many conditions that it is impossible to give even an approximate answer to this question. I have never yet heard of chaff being bought or sold by the cubic yard."

PROTECTING WOOD AGAINST WHITE ANTS.

"Yorketown" wishes to know of a specific which will prevent white ants attacking wood.

Mr. W. L. Summers replies—"The writer does not say whether it is wood in the ground or above ground that requires to be protected. There are several preparations on the market which are claimed to be effective in protecting wood against white ants. I have had some experience with fence posts in soil where the ants are troublesome, and have found that charring and tarring or painting with an arsenical paint will keep the ants away for a considerable period. Soaking the end which is put in the ground in a strong solution of bluestone was somewhat a failure."

DESTROYING PRICKLY PEAR.

"R. B.," Meningie, writes—"We have in one of our paddocks a patch of prickly pear covering an area of about a quarter of an acre. This, of late, has been spreading, and in view of the trouble this plant has caused in New South Wales and Queensland we want to get rid of it. Can you advise the strength of the arsenical solution that is used for this purpose, the cost, and how it is applied?"

Mr. W. L. Summers replies—"Chop the trees down, slash the leaves, and spray with a solution of arsenite of soda; then put into a heap. Make the solution by boiling 1lb. white arsenic and $\frac{1}{2}$ lb. of soda ash (or 1lb. washing soda) in 4galls. of water and dilute to make 10galls. On the stumps left in the ground pour a little of the original solution, *i.e.*, 1lb. arsenic to 4galls. Keep stock away, and if the stumps show signs of growing repeat the treatment. Great care must be exercised in handling and preparing the solution, as it is very poisonous. The tin in which it is boiled should not be used for anything else. White arsenic costs about 3d. per pound, and soda ash about 1 $\frac{1}{2}$ d. per pound.

FODDER FOR DRY DISTRICT.

"D. M.," Yongala, writes—"I shall be glad if you can tell me of any grass or other fodder plant that it would pay to sow on hilly country near Blackrock, where the average rainfall is about 12in."

Mr. Summers replies—"It appears from this inquiry that a permanent pasture is desired. We do not know of any grass or fodder plant that it would be safe to say definitely that it would *pay* to sow under conditions outlined. Our native grasses, &c., are more likely to withstand the extreme conditions of the locality mentioned, but whether they would pay to establish artificially is open to question. Much could be done to improve the natural herbage by protection against rabbits, moderate stocking, the breaking up of bare patches, and, where possible, the application of a light top-dressing of stable manure. This is a subject that might well be discussed at meetings of the Agricultural Bureau."

DUCKS FOR MARKET.

"A. R. B.," Monteith, writes—"I should be obliged to know what would be a good kind of duck to breed for table purposes and the quickest for fattening for market purposes, and what is the best kind of food to give them to get such results?"

The Poultry Expert (Mr. D. F. Laurie) replies—"The Pekin, or a cross between Pekin and Aylesbury, will give the best results for market purposes and also for export, as ducklings with white plumage only are suited for the latter trade. Feed on bran and pollard mixed with skim milk, and add a good percentage of animal food (such as boiled rabbits or meat meal). During the last three weeks they may have fat (tallow) added to their food at the rate of 1lb. for 40 ducklings daily. They should be ready in nine weeks, and weigh 5lbs. to 6lbs. The stock birds should have water to swim in, but the market ducklings only require enough to wash their heads and a swim to clean them before sending them to market."

SPRAYING WITH ARSENATE OF LEAD.

"A. R.," Riverside, Wandearah, writes asking what strength of lead arsenate to use, what stage the trees should be in when the spray is applied, and what quantity should be used on each fully grown tree. He mentions that he uses the "Bluebell" brand.

The Horticultural Instructor (Mr. G. Quinn) replies—"Instructions respecting the quantity of lead arsenate to be used in a given number of gallons of water are usually printed on the vessel containing the poison. In the case of most brands, such as the one mentioned, 1lb. in 20galls. of water has proved a reliable preventive of codlin moth. With respect to the quantity to be used on each tree no exact amount can be given, as the size of the tree, the quantity of fruit borne by it, and the accessibility of the fruit to the spray would all help to determine this question. Generally speaking, however, from 3galls. to 5galls. would be required, according to the size and the crop borne. The indication when to begin spraying is given by the fall of the blossoms, and a second application should be repeated about 14 days later, and a third about four weeks afterwards. For very late maturing sorts, such as Rome Beauty, Stone Pippin, &c., a fourth application should be given about the end of January, more particularly if neglected gardens are in the vicinity."

WOOD BUGS.

"A. R.," Riverside, Wandearah, writes saying that there are millions of small grey insects, known locally as wood bugs, in his garden, and inquires whether they will do any serious injury.

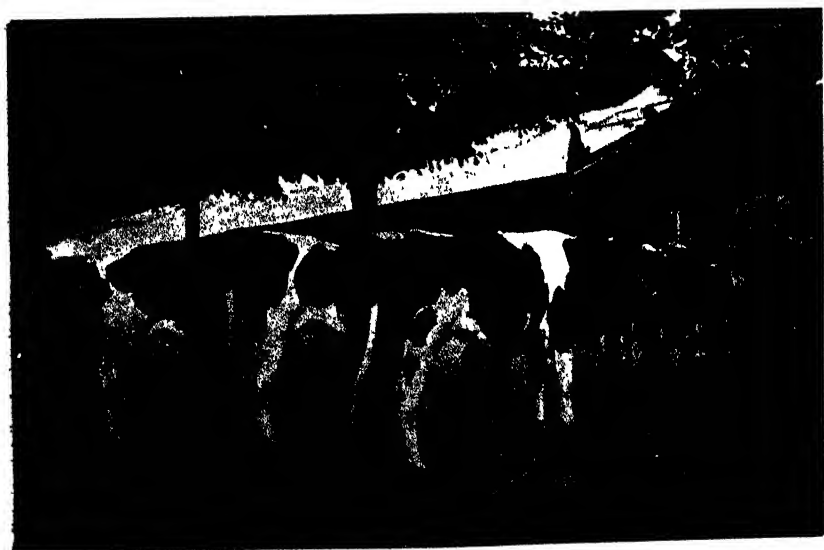
The Horticultural Instructor (Mr. G. Quinn) replies—"The so-called wood bugs are not destructive to vegetation, and are not looked upon as garden pests, but their presence indicates a certain amount of stagnation in the soil and certainly the presence of rubbish, which affords them shelter."

PRUNING ORANGE TREES.

"W. E. F.," North Unley, writes with respect to the pruning of orange trees which were planted out last season, and which have made only a limited quantity of growth, but which are still healthy. He wishes to know whether those trees should be pruned hard, after the manner of the second winter pruning applied to deciduous trees.

The Horticultural Instructor (Mr. G. Quinn) replies—"If the trees are healthy they should not be pruned severely, and it is questionable whether any pruning at all is necessary unless some of the branches are very much entangled. As a rule orange trees during the second and third years will make somewhat strong growths, which arise from no particular portion of

the plant, although they generally emerge from lower down than the original framework of the top. These if above the point of the graft should not be cut away, but permitted to make free growth. Frequently the future body of the tree is framed out of these shoots, which on a grapevine would be termed watershoots. In the meantime the original top remains stunted and frequently has to be cut away as useless growth later on. The strong growths referred to may often be regulated so as to balance the top of the tree something after the style adopted with other fruit trees, but beyond this the framing of the citrus tree is not set down upon such closely defined lines as the apple and other kinds of fruit trees. Citrus trees with us are large shrubs, and as such are grown so that the pruning consists chiefly of merely spacing the branches to enable a proper circulation of light and air throughout the tree. These operations may be carried on at almost any time of the year, but usually as soon as the fruit crop is off the necessary pruning is done. It should be clearly understood that all dead wood, as far as is practicable, must be kept out of citrus trees, as it is the principal source of injury to the growing fruits through scratching them. When the fruits are very young small injuries caused by scratches produce no apparent ill effect, but when the fruit arrives at maturity the weakened skin spot is unable to resist the action of moisture and various other external agencies, and the result is that the epidermal layer decomposes, and this decomposition is subsequently followed by the ingress of destructive forms of fungus, chief amongst which is the common mould."



FRIESIAN HERDBOOK COWS, HOLLAND.

AGRICULTURE IN OTHER LANDS.

By Professor PERKINS,* Principal of Roseworthy Agricultural College.

III. GREECE.—*Sheep and Cattle.*

(Continued from page 32.)

Marseilles, May 10th, 1910.

Greece has a source of riches in its flocks and herds, full advantage of which is perhaps not taken. For the most part Greece is a country of short, sweet pastures, adapted mainly to sheep; hence it is but rarely that large herds of cattle are met with. The bulk of the country makes use of goat's milk for alimentary purposes; hence milch cows are not very much in evidence. There do not appear to be any good local milch breeds; and when good milch cows are required they are imported from Switzerland, Odessa, Crimea, and Italy. I had occasion to see some very fine specimens of Swiss cows on a private farm in the neighborhood of Athens. Local cattle are kept mainly for breeding working bullocks, upon which the bulk of farm work falls. They are evidently very poor milkers, yielding barely enough milk for their calves. Of draught horses there are practically none. One meets with small, underbred, ill-fed ponies which, in the matter of draught, are Jack of all trades.

There are not many pigs in the country; they were estimated for me at about half a million. The native pig is in general conformation very little better than a wild boar. He is leggy, with heavy head, lean flanks, and no hams to speak of. The prevailing color is sandy, although occasionally black and white pigs are met with. I was informed that local pigs lost on dressing on an average 25 per cent. The fact is that Greeks do not appreciate fat pork; they secure all the fat necessary in olive oil.

I have purposely left sheep last because they form the most important and most typical live stock of the country. The flocks of sheep and goats are estimated to total 5,000,000 head. It is perhaps difficult for us to realise their mode of existence. Like the Merinos of Spain they form essentially migratory flocks, changing their pastures with the seasons. In the winter, for instance, they come down into the warmer and more sheltered valleys, whilst the return of summer soon sees them on their way to erstwhile snow-clad peaks. Such a practice implies the existence of vast areas of commonage and open unfenced country. To see the sheep scattered over the mountain sides is a pleasing sight indeed; nor is it the eye alone that is flattered. The great majority of the sheep are provided with sweet-sounding bells, which in the distance recall the gurgling of running waters over a rocky bed; and as of old, from the shade of rock or stunted shrub, the watchful shepherd

pours forth melodies from the rustic pipe. These flocks are exceedingly tame, and the shepherds appear able to gather them together by their cries. It is not that dogs are wanting; indeed, there are more than enough of them, as the unwary visitor who approaches the camping ground often discovers to his undoing. These dogs, however, are not sheep dogs in our sense of the term, but merely watchdogs, whose special duty it is to keep off marauders, jackals, foxes, &c. The extreme docility of the flock is exemplified by the fact that they may frequently be seen on the roads following the shepherd and not driven by him.

In the country one sees sheep everywhere, and not always in large flocks. Children may be seen shepherding half a dozen, or a dozen sheep and goats. I have even seen single sheep tethered by a long rope to a picket driven in the ground. I often thought as to the consequences of such treatment to one of our wild station-bred Merinos!

In Greece sheep are exploited principally as milch beasts; and as, from our point of view, such a treatment is altogether novel, I availed myself of every opportunity to cross-examine the shepherds as to their practices, the gist of which I propose summarising. I must add that through the kindness of Mr. D. Steele, manager of the Kopais Land Co., I was able to visit the temporary settlement of some Wallachian shepherds, by whom I was received with princely hospitality. These shepherds come down in the winter from their snow-clad Thessalian homes into the rich Kopais pastures, where they lead a life of patriarchal simplicity. Similar in type, I imagine, must have been the old Highland clans. It was amusing to note the deference paid to the head of the clan, who, although university-trained, was content to lead the free nomadic life. We dined with the chief alone, and were assiduously waited upon by minor clansmen. The *piece de resistance* was a lamb roasted whole, and in deference to our prejudices, knives and forks and plates had been secured for us the day before, together with a variety of delicacies supposed to be essential to more civilised but more effete guests. The repast closed with coffee and excellent brandy! But I am wandering, and must return to our subject matter—*moutons*.

There appear to be only two breeds of sheep in the country, or perhaps three, with crosses between them. What I take to be the true Greek sheep is a rather small animal, as are all essentially mountain breeds. I was told that a good average ewe dressed from 29lbs. to 32lbs., and a very good ewe 42lbs. to 48lbs., whilst an average ram would dress 48lbs. to 50lbs., with occasional ones running up to 70lbs. It should be noted that in Greece the dressed weight includes the head, which is not detached. These sheep have generally black or black and white faces, and black legs; the black color frequently extends partly over their bodies, so that a big percentage of them may be described as piebald. Completely black sheep are very frequent, forming, I should judge, fully 20 per cent. of the flocks. The nose is Roman

and the face free from wool; indeed, I was told by a shepherd that lambs showing any trace of wool on the face were always sold, the objection being that butchers feared that sheep of this kind had more wool than flesh. There is no wool on the legs, and very little on the belly. The legs are strong, stout, and sturdy, and bodily conformation, from the point of view of butcher's meat, rather poor. The ewes are all provided with excellent udders, being in that respect more like cows than sheep in our estimate. They are provided with long, thin, rat-like tails that are kept clipped of wool to facilitate milking.

Such, then, is the sheep met with in the mountains; in the plains one meets with a large, better developed sheep of similar type, which is in all probability derived from the former.

In addition to these purely Greek sheep the fat-tailed Asiatic sheep is also occasionally to be met with. This sheep is a better butcher's beast, but on the whole less hardy and less able to travel and withstand the hardships of mountain life. Nor does he yield anything like the same quantity of milk as the usual Greek mountain sheep; hence pure fat-tailed sheep are rarely met with, although crosses of it are not infrequent.

I was informed by Mr. Chassiolti that various European breeds of sheep have been tested in Greece, but without success. The Larzac—the great French milking breed from which Roquefort cheese is made—were found inferior to the native breeds. They were not sufficiently hardy, nor did they yield as much milk in similar conditions. Merinos proved quite useless, because of their inability to yield sufficient milk, and the objection of butchers to their dark, strong-flavored flesh. According to Mr. Chassiolti, rams of English breeds—Southdowns, Shropshires—had to be set aside, as they were unable to withstand the heat of the country. Knowing as I do how these breeds are able to thrive under still warmer Australian skies, I have difficulty in accepting this statement. The position is, I believe, that probably nowhere else in the world will there be found a breed of sheep capable of replacing local breeds so long as milk forms the main source of revenue of a flock.

Notwithstanding the bleakness of the winters, the practice of dropping lambs in the early winter appears to be universal. This I take to be so because the rich summer feed of the mountains is needed for the production of milk as soon as the lambs are weaned off. I very much suspect that the rams run with the ewes the greater part of the year, although I had some difficulty in ascertaining what was actually the practice in this direction. One shepherd informed me that the rams were admitted to the flock in early August; that they stayed there from two to two and a half months, but never more than three months, and that the bulk of his lambs fell in December and January. I asked him how it was that lambs appeared still to be falling in April, the time of my visit. This he attributed to accident, or to ewes

having been missed earlier in the season. Another shepherd informed me that the rams ran with the ewes from August to May of the following year; and, judging from the general irregularity of the lambing, I am inclined to think this the general practice. I was told that very early lambs were occasionally dropped in October from strong, well-fed ewes, whilst weaker ewes dropped their lambs in spring; but that, as a matter of current practice, it was always sought to avoid spring lambing.

The lambs are neither tailed nor castrated, and are sold to the butcher when between two to two and a half months old, so that their mothers may take their places in the milking sheds the sooner. At this age they dress from 17lbs. to 20lbs.; and from experience I can aver that the cutlet of a Greek lamb is a little less than an average mouthful, although very sweet withal. I was informed—and could readily appreciate the fact—that if killed at a later age the flesh was inclined to be rank. Lambs that are kept back for the replenishing of the flock are all weaned off when three months old, in the interests of the milk supply.

The milking of the ewes starts in February, when the bulk of the lambs have been weaned off or disposed of. In order to facilitate milking operations the wool of the tail and around the udder is clipped close, and in this condition a flock of sheep present a most peculiar appearance. The milking continues right up to August and September, the milk of these months being very rich if not over-plentiful. The ewes are milked twice a day in rough brushwood yards erected in the pastures. I was informed that 10 average milkers (always men) could milk 800 to 900 sheep in an hour. For a ewe new to the operation two men are needed to enforce the requisite docility. The ewes are milked from behind and not from the side, as with cows. A good ewe will yield about 1lb. of milk a day. The ewes' milk is made into various forms of cheeses, which, when one has become acclimatised to them, are not at all unpleasant. Butter apparently is made exclusively from goat's milk.

The ewes go to the rams as two-tooths, and will carry about six lambs, after which they are fattened and sold to the butcher. Some ewes appear to have sound mouths even at eight years old. One shepherd informed me that he always fattened off and sold the dry ewes of the preceding season: he had found that barrenness was frequently caused by milking the ewes too late in the season. Another shepherd told me that he always kept his dry ewes, even if dry several seasons in succession, because they helped to improve the appearance of his flock.

As to the rams they are first used as two-tooths, when they are allotted 15 ewes each; thereafter they receive 30 ewes; although one shepherd told me he always used seven rams to 100 ewes. Old rams are fattened off when five years old and sold to the butcher in the month of May, when it is stated the flesh loses most of its rankness, which I am inclined to doubt.

Castration of lambs is not practised, as I have already stated. A few ram lambs, however, when 12 months old, are castrated by tying a piece of string round the purse, and are kept as bell wethers to lead the flock. No selection in the matter of ewes appears to be practised. When questioned as to how he selected his ram lambs, one shepherd told me that his first point was good stout legs, his second a typically characteristic masculine head, and his third a good, sound, long fleece.

The flocks pasture at freedom night and day in the summer months, but in the winter, when accompanied by their lambs, they are regularly yarded at night. Salt appears to be appreciated, for one large sheepowner informed me that in winter he gave as much as 28lbs. of salt a day to 100 ewes, which practice led to their drinking very freely. Shearing starts about mid-May. I was informed that the mountains were free from burs and the seeds of weeds that spoil the fleeces. The shears are very primitive, like a large pair of tailor's scissors. The estimate of shearing records varies very considerably. One shepherd informed me that an average shearer could shear about 35 sheep a day; an expert one about 40; whilst another stated that in eight hours a good man could shear 120 to 130 sheep; three minutes to the sheep, he said, was sufficient. The wool is rather long but exceedingly coarse, more like hair than wool, and the fleece is open and loose. A good ewe will average about 5½lbs. of wool, whilst a good ram will cut from 7lbs. to 8½lbs. The local value of this wool is about 6d. a pound, although occasionally as much as 9d. a pound.

The value of lambs varies very considerably with seasons and opportunities. Instances were quoted me of lambs (two and a half months old) having fetched more than £1 a head; others again state the average value to be 7s. 6d., and others 12s. 6d. One shepherd assured me that his lambing was always 100 per cent.; when pushed he admitted that it might be as low as 95 per cent., but never below. Another frankly admitted that he reckoned 80 per cent. a good lambing. From the above figures I am able to work out the revenue of an average flock as handled in Greece:—Lamb, per ewe, 7s. 6d. to 12s. 6d.; milk, per ewe, 8s. 6d. to 12s. 9d.; wool, per ewe, 2s. 3d. to 3s. 4d.; revenue per ewe, 18s. 3d. to 28s. 7d. The relative unimportance of the fleece value will be noted. I am informed that it is reckoned that the milk pays all expenses of the flock. I am told that with help at milking times one man can manage 500 sheep in summer, and in winter at lambing time not more than 100 sheep.

Dips appear to be unknown and the sheep fairly healthy. Fluke and foot-rot are naturally unknown in the mountains. Sheep suffering from scab are painted over with hot oil and sulphur. Hot oil applied locally kills tick. Flyblown sheep are sprinkled over with black pepper and then smeared over with tar.

WHEAT IMPROVEMENT.

No. II.

WM. ANGUS, B.Sc., Director of Agriculture.

A very important matter in successful wheat-breeding is the selection of the heads of the varieties to be crossed. These varieties must be grown under observation, and the best heads carrying fixed characteristics should be selected from which to grow the parent plants. From these, in turn, the breeder selects the best ears upon which to operate. These must have the qualities which the breeder wishes to combine in the offspring. Of course he must know these qualities, and he must have the judgment to recognise them and to select those plants which possess them in the highest degree; hence the necessity for having carefully studied the characteristics of the various varieties with which he is going to work.

One difficulty often faces the breeder in that he is dealing with varieties which, if sown together, come into flower at different times. To obviate this difficulty, the breeder plants his two varieties at such times as to have them both coming into flower together. One way of doing this is to make two or three sowings of one of the varieties to be used with, say, a week between each sowing. This, however, can only be carried out when dealing with a few varieties, and when work on a large scale is being undertaken care must be exercised in sowing the various breeding plots so as to bring most of those to be crossed into flower together.

Having selected the right plants, before the actual crossing can be accomplished it is necessary to prepare the plants for this operation. This applies mainly to the plant to be used as the female. The spikelets in the middle of the ear have the greatest vitality and carry the best grain, hence it is desirable to work only with the chests about the middle part of the ear. Consequently those at the base are pulled carefully off or clipped away, as is also the top part of the ear. For this purpose a small dissecting scissors is used.

If the ear belongs to a dense or close variety it is advisable to remove alternate spikelets on both sides of the ear. This is done either by pulling off with the forceps or clipping them away. The median florets are then removed by scissors, leaving only the two outermost florets of each spikelet.

CROSS-POLLINATION.

Coming now to the actual crossing, this is by no means a difficult operation. In order to ensure successful work, care, patience, and delicate handling

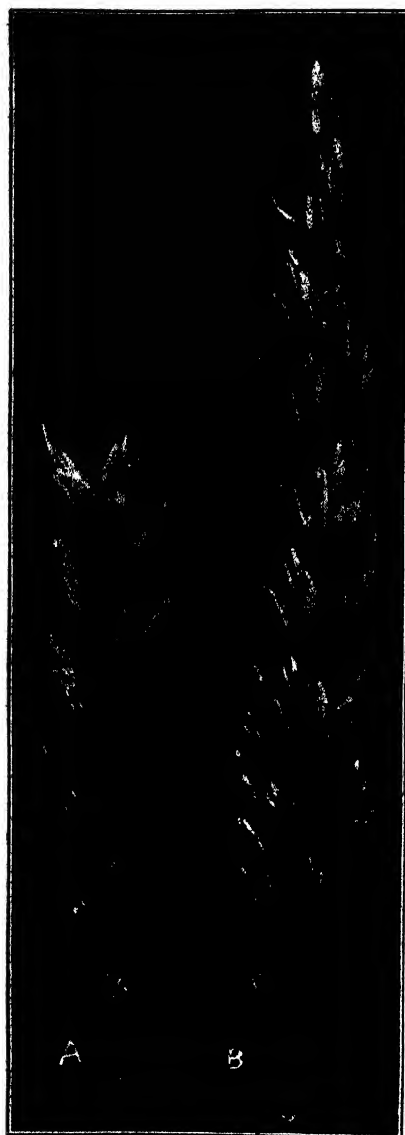


Plate 9.—A. Head Prepared for Crossing.

of the ears are essential. A reference to Plate 8 (Article I.) will show that the flower consists of a stigma and three anthers carrying the pollen which fertilises the ovary. The first process is to remove the anthers from the

flower of the female plant before they burst and shed their pollen. To do this the fertile glume and palea are forced gently apart by inserting the points of the forceps between them. These are easily opened by relaxing the grip on the forceps, which moves the glumes outwards and the parts of the flower become visible. It is always safe to perform this part of the



Plate 10.—Figure of Opened Floret, showing Anthers.

(A) Infertile Glume. (B) Glume. (C) Palea. (D) Anther, or pollen sac. (E) Stigma.
(F) Central stem of head.

work early so as to avoid all risk of self-pollination. The state at which to remove the anthers is seen in Figure 1 of Plate 8. If the anthers are allowed to grow to the stage seen in Figure 2 of Plate 8 the chances are that a considerable amount of the pollen has been shed and the stigma already fertilised. Anyone accustomed to the work will at a glance be able to tell whether or not this has taken place.

To remove the three anthers insert the tips of the forceps and grasp one at a time by the filament or little stalk supporting it, carefully picking it out. When the three have been removed, if the plant does not seem ready for crossing, carefully close the glume and palea, repeat the process of emasculation with each of the florets remaining on the head, and then cover the head with a thin coating of cotton wool or a thin tissue paper bag, so as to keep out all foreign pollen until you are ready to proceed with the second part of the operation.

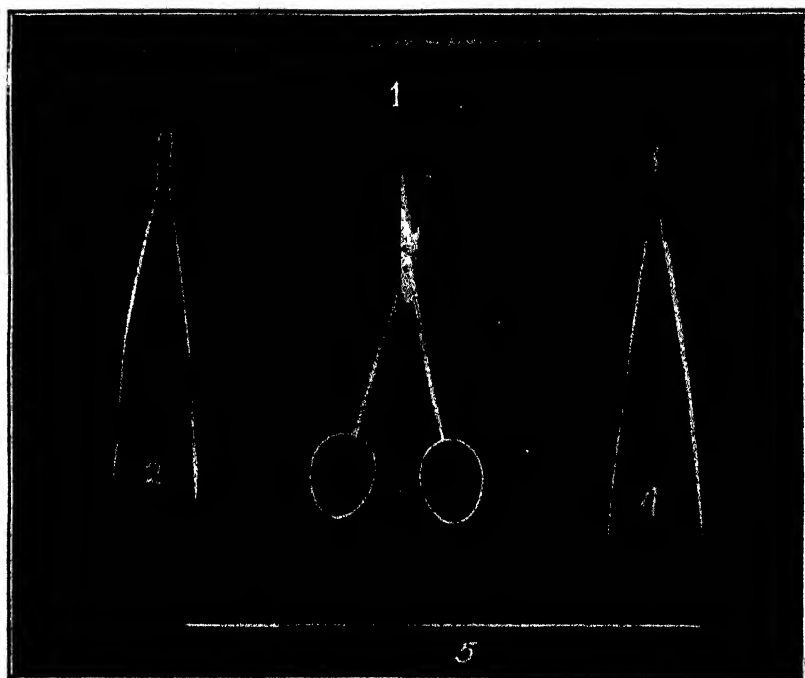


Plate 11.—Instruments Used in Pollinating.

(1) Botanic needle. (2) and (4) Forceps. (3) Scissors. (5) Camel hair brush.

Pollination is effected by dropping the pollen from a freshly-opened anther on to the stigma of the floret that has been prepared for its reception so soon as it is seen that the stigma is ready. A supply of these anthers must be on hand, and this is best provided by having a few selected ears of the pollen-producing variety in which most of the anthers are showing a full yellow color, and, indeed, in which a few of the forward florets are showing anthers already burst. The ripe anther is taken hold of between the points of the forceps and inserted into the emasculated floret when the pollen from the

bursting anther is shed in quantity on the stigma. The palea and glume are then carefully closed by means of the forceps, and the rest of the florets remaining on the rachis treated similarly. When the whole has been completed the ear has to be protected in some way or other from foreign pollen that might be dropped on it by the wind. This can be done either by wrapping it in a thin coating of cotton wool and securing this by a piece



Plate 12.—At Work in the Field.

of cotton string, or by using a tissue paper bag previously made water-proof by means of a thin coating of paraffin wax. I have, however, found cotton wool to act very well indeed if carefully wrapped round the ear and tied. This covering should be removed after a few days, else there is danger of the head breaking off through the effect of the wind upon it. Alongside the plant a stake is driven carrying a label, a duplicate of which has been tied

to the stem of the ear operated upon. This label bears particulars of the crossing as follows :—

Stanley x Federation
(Stanley crossed on Federation)
November 9th, 1909.

A footnote is added recording any special feature of the work. Before leaving these same particulars are then entered in the operator's notebook, with the exact position of the plant and the number of the peg; these in turn to be entered in the breeding record kept on the station.

In this introductory part we have endeavored to explain the structure of the ear of wheat, and also the process of crossing in so far as they are required by anyone who may wish to undertake work of this kind. We now propose to describe the characteristics of the various varieties which we have used in crossing at Parafield, adding notes on the different crosses which we now have under observation.

FEDERATION.

This splendid variety was bred by the late W. Farrer, of New South Wales. Improved Fife, an American strong-floured wheat, was crossed by an early Indian variety called "Etawah." The cross from this he called "Yandila," which, by the way, was used in the breeding of our so popular Yandilla King. This Fife-Indian cross was then used with a strain of our Purple Straw, thereby getting Federation. From this pedigree it will be seen that in the breeding of this variety we combine the early and prolific qualities of the Indian strains and the strong flour qualities of the American wheats with the important qualities of high yield and excellent color of flour found in our Australian varieties.

Description.—In a field Federation shows very marked characteristics. It has short, hollow, but stiff straw, and a fairly broad flag. It stools fairly freely, and the heads are carried erect on the stalk. It is a beardless variety in which uniformly broad spikelets are packed closely together. The chaff is characteristic, too, in being dark or bronze colored, especially at the exposed tips. Although not displaying the fine golden color with which we associate ripened wheat, the erect, plump, long heads afford a very pleasing sight. The



Plate 13.
Head of Federation.

grain of Federation is of medium size, plump, and well filled, waxy in color, and soft.

In passing judgment on the qualities of any variety of wheat it must be considered from the point of view of the grower, the miller, and the baker.

From the grower's point of view we have to consider the yield, ease of stripping, power of holding its grain, resistance to cold and drought, earliness, and immunity to disease. Federation is a grain-producing variety, not a hay wheat, and there is probably no other variety to equal it in this respect. Not only is it a very high yielder, but it has the power of adapting itself to the different conditions of climate and soil, a most important factor in a country like Australia. In the hot, dry North, in the cool, wet South-East, on the light, sandy soils of the Pinnaroo and Loxton country, and on the heavier soils of the Salisbury plains we find Federation taking premier place amongst our varieties. Not only is this true of South Australia, but we find those in a position to know speaking in equally favorable terms of it as a yielder, both in New South Wales and Victoria.

SOME YIELDS OBTAINED FROM FEDERATION IN DEPARTMENTAL EXPERIMENTS IN SOUTH AUSTRALIA IN SEASON 1908-9.

Locality.	Federation. Bushels.	Next Highest. Bushels.
Snowtown	44	—
Loxton	34	Gluyas..... 18½
Salisbury	30½	Yandilla King..... 27½
Kybybolite.....	31	—
Lameroo	32	Dart's Imperial 28½
Streaky Bay	20	Carmichael's Eclipse..... 12½
Rhine Villa	30	King's Early 25½
Monarto	27	Dart's Imperial 22½
Lipson.....	35	Yandilla King..... 36½

We cannot call Federation an early wheat. At best it is a late early, but it should be classed as an early midseason variety. In this it could be improved for our northern districts, where earliness in ripening is a distinct advantage. From its strong straw and erect, clean head it is a variety which strips most easily, at the same time just holding its grain sufficiently well to prevent shelling. Not only does it strip easily as compared with, say, Yandilla King, but it is deceptive in that it yields better than it looks. From a few sources have come complaints of slight liability to shell, but although working with it under careful observation for the last five years, we have failed to note this.

Although the breeder had in view in raising his new wheats the idea of having them immune to disease, we cannot say that he succeeded in this respect with Federation. Although liable to rust—our greatest wheat pest—it is not nearly so much so as others of our common varieties. We must also include it in the list of those that are affected by both smut and bunt, but these diseases are preventable by careful handling of the seed on the part of the farmer. Summarised from the grower's point of view we find Federation a heavy yielder, fairly early in ripening, easy to strip, adaptable to changes of climate and soil, and somewhat liable to rust, smut, and bunt.

In South Australia we find this variety popular with the miller. It is not a wheat that gives a high weight per bushel, but it is both easy to mill



Plate 14.—Parafield, showing the Breeding Plots.

and gives a good percentage of flour; in other words, it is a thrifty milling wheat. The following table will give an idea of its milling properties :—

MILLING RESULTS OF FEDERATION.

South Australia.

Flour, 70.7 per cent. ; ofal, 29.3 per cent. ; color, very good ; strength, 46.0 ; dry gluten, 6.57 ; nitrogen, 1.4 ; consistency of dough, fairly soft, fairly elastic, fairly short.

Milling Notes.—Bran, large and clean ; semolina, white and granular ; very easy to mill.

From the baker's point of view the final test of quality in a wheat is its capacity for making a loaf acceptable to the consumer, and in this strength and color of flour are very important considerations. Federation is not a strong flour wheat, but occupies an intermediate position between the soft Purple Straw types and the stronger Comeback types.

Not only must the strength be considered in relation to the loaf, but also the color of the flour. In this direction Federation is satisfactory, as will be seen from the above table. The flour from a bulk lot of grain milled at our request was baked by expert bakers, and the following notes give some idea of how it behaved during the process of baking:—

BAKERS' NOTES ON FEDERATION FLOUR.

Messrs. Condell & Collins—"Federation is a good working flour and has a good color."

Mr. D. Kinnaird—"Federation is a good commercial flour."

While Federation possesses many valuable qualities, we must not assume that it is incapable of further improvement, even in the matter of its yield. We found it, *inter alia*, deficient in strength, susceptible to rust, and for many districts it is rather late. Crosses have been effected with the object of improving this valuable variety in these respects, as well as to increase its productivity. With these we shall deal in the next article.

EXPERIMENTS WITH POTATOES.

ERRATUM.

We regret that in the August issue, on page 49, a mistake was made in the table showing the results of the potato experiment at Mount Barker. In the last column the figures are those of the yield per plot instead of the yield per acre. The following table, therefore, gives the correct results:—

VARIETY—SNOWFLAKES.

Plot.	Manure per Acre.	Yield per Acre.		
		Tons	cwts.	lbs.
1	2cwts. mineral super., 2cwts. bone super., 1cwt. nitrate of soda, 1cwt. sulphate of potash	3	15	0
2	2cwts. mineral super	4	11	0
3	2cwts. mineral super, 2cwts. bone super.	4	11	56
4	No manure	2	10	56
5	10 tons farmyard manure	6	16	0
6	10 tons farmyard manure, 6cwts. mineral super.	7	10	0
7	2cwts. mineral super., 2cwts. bonedust, 1cwt. sulphate of potash	6	10	56
8	2cwts. mineral super, 2cwts. bonedust, 1cwt. nitrate of soda	5	15	0

CRESWELL TROPHY FOR WHEAT.

The Royal Agricultural and Horticultural Society of South Australia is offering for competition at the March, 1911, Show prizes of £25, £10, and £5 for exhibit of wheats grown under the following conditions :—

Area to be grown by each exhibitor to be not less than 10 acres of wheat.

All wheat to be distinctly named.

Two acres (correctly measured) to be harvested in the presence of a steward, who shall certify to the total quantity produced from the two acres.

Ten pounds of the wheat to be bagged and sealed in the presence of the exhibitor or person representing him and taken by the steward. Sample taken to be the one to be judged in connection with the trophy.

Stewards to pull by the roots a sheaf of the crop in wheat of not less than 6lbs. in weight. Samples to be taken, if reaped by harvester, direct from the machine; if reaped by stripper, after sample put once through winnower.

Three bags of the wheat to be sent for exhibition at the Society's show.

Exhibitors to give reasonable time (not less than five days) of their intention to harvest the crop, in order that stewards may be present.

a. Entry to state (for information only) the rainfall in inches of district where the wheat is grown.

b. Quantity of manure per acre to be stated.

c. Quantity of grain per acre sown also to be stated.

Society to pay cost of railage and other charges from railway station nearest farm to Show Grounds.

Entry fee, 20s. each entry.

The wheats will be judged on the following basis :—

A. 1. Yield, bushel per acre	25 per cent.
2. Retention of grain	10 "
3. Resistance to red rust	15 "
4. For each pound per bushel over 62lbs. to the bushel	15 "
B. Milling qualities of sample of flour :—	
a. Yield	8 per cent.
b. Color	10 "
c. Strength.	10 "
d. Gluten.	7 "

As will be seen from the above conditions the object of this trophy in memory of the late John Creswell is to encourage the production of wheats which not only are of good quality from the show point of view, but also from the farmer's point of view, *i.e.*, yield per acre. Under the usual show conditions a wheat that weighs and looks well and is of good milling quality may win the prizes, even though it is such a poor yielder as to be unprofitable to grow. In this competition, however, the society errs rather on the other side, as with 25 points per bushel for yield almost ensures the heaviest yielding wheat securing the prize irrespective of its milling qualities.

With a view to making the competition of an educational value the society requires the competitors to furnish particulars as to rainfall, kind and quantity of seed sown, and also quantity of manure used. If, in addition, details

as to cultivation were obtained the information would be of great value to the State and of help to other farmers. In some industries the furnishing of information of the character would be regarded as a disclosure of "trade secrets," but with wheat-growing there would be no such objection, and we believe that growers would willingly furnish the desired information.

In this connection it is opportune to call attention of our readers to the lack of competition in the general wheat sections of the March Show. South Australia is so largely dependent upon her cereal crops that one would expect farmers to take a keen interest in the exhibition of wheat at the national show, but the reverse is the case. The officers of the Agricultural Society and the Agricultural Department are much exercised in their minds as to the cause of this lack of interest. The Branches of the Agricultural Bureau have been requested by the Advisory Board to discuss this question with a view to stimulating competition and making the grain exhibit at our show worthy of the State.



"BLUE RIBBON OF TURRETFIELD."

DEEP v. SHALLOW PLOUGHING FOR WHEAT.

By W. L. SUMMERS.

Some two years ago several members of the Redhill Branch of the Agricultural Bureau undertook to carry out experiments with the Campbell system of soil cultivation, and to report results of same to the Bureau. In a recent report from the Branch the Hon. Secretary mentioned that the members submitted their reports, and, strange to say, in no case was the yield greater than with ordinary fallow.

No reports or details to show how this conclusion was arrived at were submitted. As the matter was of so much importance, I wrote to the secretary and asked to be placed in possession of the reports, as we could not publish such a definite statement without them. In reply I received details from three members, but, with one exception, these lacked details necessary to enable any proper comparison to be made.

Mr. S. H. Treloar submitted a comparative statement of the work on eight acres ploughed to a depth of 8in. and 12½ acres ploughed only 4in. The soil on which this experiment was carried out is described as a very strong, heavy, piece of land, very sticky when wet; inclined to bake and come up lumpy if not worked just when in the right condition as to moisture.

The difference in the method of working the two plots is shown in the following parallel statement:—

	Deep Working.	Shallow Working.
1908.		
February..	Skim ploughed	Skim ploughed.
June	Ploughed 8in. deep; harrowed at once with scarifier-harrows, and again a little later	Ploughed 4in. deep.
August ...	Cultivated once	Harrowed with scarifier-harrows once.
September	Harrowed twice (at intervals) with scarifier-harrows	
1909.		
February..	Harrowed once with scarifier-harrows and once with light harrows	Harrowed with scarifier-harrows.
May	Cultivated 3in. deep; drilled and harrowed after drilling.	Cultivated 3in. deep; drilled and harrowed after drilling.

Both plots were sown with 70lbs. of Marshall's No. 3 wheat and 70lbs. mineral super. per acre. The fields were harvested in December. The deeply-worked land produced a very heavy crop, which went down badly and was very difficult to reap. The heads were exceptionally fine and heavy. Thirty-two bushels per acre were reaped, but over 6bush. per acre were lost. The shallow-worked crop was also very good, slightly down, and yielded 30bush., while 2bush. were lost in the harvesting.

Mr. Treloar estimated the cost of cultivation, harvesting, bags, sowing, and carting wheat to station at £21 for each plot, while the total returns amounted to £52 18s. 9d. in the case of the deep-worked plot and £75 for the other, at the current prices for wheat.

While the details indicate thorough preparation of the soil in the deeply-worked plot, in the absence of the subpacker and of cultivation during the growth of the crop it cannot be said that the land was worked under the Campbell system. This applies with greater force to the tests carried out by other members of the Branch. Further than this, working with a skim plough four months prior to fallowing is an unusual custom in this State, but is a modification of a practice which Campbell lays special value upon in his system. In reply to my query on these points Mr. Treloar wrote that while skim-ploughing preparatory to fallowing was a new practice it was in his opinion a very good one. He said—"I found the fine mulch went to the bottom of the ploughing, and with the subsequent harrowings lay very close and fine. When we drilled the crop in the surface was only moist, but below 4in. it was wet—I could almost squeeze water out of it. This fact confirms me in the opinion that the deeply-worked plot would have carried the crop through a very severe dry spell—in fact, during September and October, when we had a very trying time, it did not appear to feel it in any way. On our land I am sure the Campbell subpacker would not work when the soil was at all wet."

It was further pointed out to Mr. Treloar that the cost of working appeared very high on the deeply cultivated plot; also that nothing was allowed for extra seed and manure, rents and taxes, on 12½ acres as compared with eight acres. The cost per acre of the two systems worked out as under—

<i>Deep Ploughing, 8 acres.</i>		£	s.	d.
Average cost of cultivation		2	12	6
Rent—22 months at 8s.		0	14	8
Seed		0	5	0
Manure		0	2	10
Total per acre		3	15	0
Value of yield per acre		6	12	4
Profit, per acre		2	17	4

In addition, 6bush. broken down would be of some value for feeding. At even 2s. per bushel it would bring the profit to £3 9s. 4d. per acre.

Shallow Ploughing, 12½ acres.

	£	s.	d.
Average cost of cultivation, per acre	1	13	7
Rent—22 months at 8s.	0	14	8
Seed	0	5	0
Manure	0	2	10
 Total per acre	 2	 16	 1
 Value of yield per acre	 6	 0	 0
Profit, per acre	3	3	11
Allow 2bush. lost at 2s. makes a total profit of £3 7s. 11d. per acre.			

Mr. Treloar's reply is interesting, as it touches a most important phase of the subject. He says—"I sent the parallel statement because it took the same time to work the eight acres deeply as the 12½ acres shallow, and this is the only way we can compare it, as the time available for fallowing is limited. Owing to carrying out this test I had a less area under fallow. Given reliable and competent labor, not too dear, it will pay to cultivate this land deeply, but with the great scarcity of competent labor—I have a team idle now—we must get over the work as quickly as possible during the winter months in order to get a sufficient area fallowed."

Dealing with the cost of deep working, he pointed out that he "estimated the cost of 8-in. ploughing at 15s. per acre, while the cost of 4-in. ploughing was 5s.; the scarifier-harrows were heavy and long-pointed, and were weighted so that the bars were buried. It took 12 horses to draw six leaves, and while it levelled the soil and compacted it, the cost was more than double the ordinary. The crop on the deeply-worked plot was very difficult to harvest—it took two men and six horses to one harvester to do it. The work was slow, and cost just double what the other plot did per acre. The conclusion that the shallow working was the more profitable is to me very disappointing, for I have been trying to increase the yield per acre rather than the acreage under cultivation."

It will be seen that in Mr. Treloar's opinion it is chiefly the extra time and labor involved that makes the deep working less profitable. The cost of working will vary with the nature of the land, but it would be interesting to have the experiment carried further and try 6-in. ploughing and 4-in. ploughing with the second 4in. stirred with a subsoil attachment to the plough. In Victoria an attachment of this character has been patented and has been tested by a number of farmers. It is cheap, easily affixed, and doubles the depth of working at an increase of only one-half of the draught. A number of other points in connection with the above figures might be touched upon, but the object of the writer is to call attention to an interesting experiment dealing with the more thorough preparation of the soil for cereal crops.

ANALYSES OF SOILS, HUNDRED OF PRICE.

Some four months ago the Geranium Agricultural Bureau requested the Minister of Agriculture to undertake the analyses of typical samples of soils from the hundred of Price, in order to ascertain, if possible, why the results from these soils were so disappointing compared with returns from land of similar character in the hundreds of Bews and Pinnaroo, notwithstanding that the Price rainfall is higher. It was mentioned by the Branch that while a good growth of stubble was essential in these new scrub lands in order to get a burn that would destroy the mallee shoots, they had not, up to the present, been able to secure sufficient stubble for this purpose. In reply it was pointed out that soil analyses could not be accepted as a guide to the kinds of manure which should be applied to secure the desired results, there being a number of important factors besides the actual amount of plant-food in the soil governing the fertility of the soil. With a view to securing some data for comparison with similar types of soils in other districts, the Minister approved of the Government Analyst (Mr. W. A. Hargreaves, M.A., B.Sc.) testing samples from the hundred of Price.

The following instructions for sampling each type of soil were sent to the Branch :—"Select a few places on the land in question and clear away all foreign matter, such as leaves, stones, &c. ; open out a hole in the first place about a spade width, square, and, say, 6in. deep : take a sample (a few pounds) of the *soil* and throw it on a bag labelled '1.' Then clean out the hole and take a sample of the subsoil (say 6in. to 1ft. deep) and throw it on a bag labelled '2.' Follow this practice in each place selected, taking care to throw the sample of *soil* in each case on bag 1 and the sample of *subsoil* on bag 2. Mix thoroughly the contents of bag 1 and take a sample of about 5lbs. or 6lbs. and label it '1—Soil.' Treat bag 2 similarly, labelling the sample '2—Subsoil.' When forwarding these samples, particulars should in each case be given of the nature of the natural scrub or herbage, and also of any treatment in the way of cultivation and manures, and also the results obtained."

Samples of four types of soil were submitted and the details given by the Branch, and the analyst's report on each are as under. It will be noted that the analyst's classification of the soil is not always in accord with that of the Branch, the former being based on the proportions of sand and clay present, while the latter, of course, is the general local classification.

No. 1 SOIL.—RED LOAM WITH CLAY SUBSOIL.

This is considered the best of the local types of soil, yielding 16bush. per acre of wheat first crop with 56lbs. per acre of mineral super.; covered with low mallee bushes.

Analyst's Report.—A red sandy loam over a red loam. The air-dried fine earth contained—

	Nitrogen.	Lime.	Phosphoric Acid.	Potash.	Humus.
	%	%	%	%	%
Soil	·045	0·33	·015	·146	1·35
Subsoil	·045	5·71	·013	·213	0·53

These figures indicate that this soil has a fair amount of humus for a sandy soil, although the total nitrogen is less than is generally considered necessary in a good soil. The potash is in fair quantity, but the soil is very deficient in phosphoric acid and lime. As the subsoil contains more lime, some admixture of this with the upper layer might be beneficial.

No. 2.—LIGHT CLAYEY SOIL.

This has been cropped twice, 70lbs. per acre of super. being applied each time, but results have been very disappointing, only 6bush. to 8bush. per acre being obtained. Although clayey the soil is not sticky; originally covered with low mallee scrub.

Analyst's Report.—A red loam over a red clay. The air-dried fine earth contains—

	Nitrogen.	Lime.	Phosphoric Acid.	Potash.	Humus.
	%	%	%	%	%
Soil	·046	0·39	·017	·330	1·72
Subsoil	·040	2·33	·017	·563	0·38

The soil is deficient in all the constituents considered necessary to make a good soil except in respect to the potash, which is in satisfactory amount. More humus is desirable in a loam than the amount shown by this sample, and if this is increased so will the available nitrogen be increased. Since it does not do well with superphosphate it seems evident that some special treatment is needed. Possibly the addition of lime in some form or other would make the soil more ready to respond.

No. 3.—HEAVY STICKY CLAY.

This is virgin land and is covered by low mallee.

Analyst's Report.—A white clay loam, with limestone over white clay and limestone. The air-dried fine earth contains—

	Nitrogen.	Lime.	Phosphoric Acid.	Potash.	Humus.
	%	%	%	%	%
Soil	·091	5·66	·045	·735	2·98
Subsoil	·054	7·16	·035	·730	2·40

From the chemical point of view this is much the best of the series, as it is well furnished in all the main constituents except phosphoric acid, and even of this there is a fair supply. So far as one can judge by the available data this soil should do well when once brought to a satisfactory state of tilth.

No. 4.—WHITE SANDY SOIL.

These sandy ridges constitute a large proportion of the district and have a material effect on the land values. There is a depth of 10in. to 15in. of soil over a clay subsoil. This soil has yielded only 6bush. per acre, but usually these sandy rises respond to a heavy dressing of super. The sand does not drift, holds the moisture well, and should prove prolific if the correct method of treatment can be determined. Originally covered with low mallee.

Analyst's Report.—A white sand. The air-dried fine earth contains—

	Nitrogen.	Lime.	Phosphoric Acid.	Potash.	Humus.
	%	%	%	%	%
Soil	·026	·11	·010	·044	0·81
Subsoil	·040	·10	·012	·046	0·65

Soil is poor in all respects. If the humus can be increased by green manuring or other means, and lime is added, it should then respond better to superphosphates. Possibly it may not be necessary to add potash for the growing of wheat.

The absence of figures for similar types of soils in the adjoining districts does not permit of any comparison being made, but these results are interesting, proving as they do that the chemical composition of the soil is not the only factor in soil fertility. Some years ago the department took samples from 10 different places in a large field near Roseworthy Station, which for years had produced probably the heaviest crops in the district. These were analysed, and the averages of the results are as under—

	Nitrogen.	Lime.	Phosphoric Acid.	Potash.
	%	%	%	%
Soil	·084	2·61	·036	·82
Subsoil	·066	4·00	·033	1·07

It will be seen that sample No. 3 does not differ very greatly, except as to lime, from the above figures.



FEEDING OF TABLE POULTRY FROM SHELL TO TABLE.

(Paper read at Poultry Conference.)

By V. KAPPLER.

I am dealing with this subject on the basis of artificial rearing. To profitably handle table poultry they must be raised in large numbers, for the gain per head is not great; and while it is easy to get good results from a few setting hens, the incubator and brooder are far more reliable and satisfactory where numbers are concerned. Incubators hatch the vigorous chicks. The weak ones die in the shell. Hens often crush the first few chicks, which are usually the strongest, and faithfully hatch the weaklings. Artificial incubation can be resorted to at any time. Birds placed on the market before Christmas are worth considerably more than those marketed after. This means June, July, and August hatchings, and during these months it is impossible to get any large number of "broodies." Leave the hatched chicks in the incubator drawer to dry and gain strength. Usually 12 hours is sufficient. Then move them into the brooder--already heated to about 90°. The brooder should be well ventilated, and the floor covered with half an inch of perfectly dry, clean, sharp sand. I have seen chaff and woollen material used, the idea being that something soft and warm is required. Chaff is often inclined to sweat, and the birds soon scuff it into heaps and then rest on the bare, hard brooder floor. Woollen material fouls quickly, and is not at all a satisfactory bedding for young chicks. Sand not only provides a soft, warm bedding, but the droppings are absorbed, and the young birds learn to pick up and fill their crops with the larger gritty particles of the sand. They thus have a chance of turning their first feeds to better account than has the chick whose first hours are spent on so unnatural an article to them as flannel or moist chaff.

Food.

For the first 24 hours or so no food should be given to the chicks. They were sufficiently provided for when they left the egg to last out twice this period. Their main requirements are rest and warmth. Having passed the first day or two on the sand they may now be given clean water in shallow vessels. The water should have the chill off. After a while a little food should be spread on some stiff paper in front of them. Very little will be consumed in the first feed or two; and after some 15 to 20 minutes remove what food is uneaten, and also the water tins. As the birds grow older the number of feeds is gradually reduced. Several special chick foods are on the market. Probably the most satisfactory food, however, will be found in flaked oats which are being prepared for human consumption, and are sound, of the best quality, and the chicks relish and thrive on them. A little chaffed

lucerne or barley, or a cabbage or lettuce leaf should be given to the chicks when a few days old. Green feed is essential to health, and is necessary if fair profit is looked for. As the birds grow older gradually reduce the temperature of the brooder, until at the end of the third week, in winter even, no artificial heat is wanted. The birds should now have cracked grain instead of flaked oats; but not until they are a month old should bran and pollard be made their whole food. A meal of it now and again, particularly in the morning, will not hurt.

HOUSING.

At a month old the birds should be moved from the brooder and placed in a dry, warm house, with the yard protected from the wind—if a grassed yard so much the better. The food should now consist of one-third to one-half green feed, a little bran, and the balance fine pollard. A little meat or green bone three times a week will be a big help, and if mixed with milk so much the better. When the sexes are to be distinguished the birds should be drafted into lots of 25, kept apart, and perches provided. The meat rations should be increased, and appetites stimulated in every way. Frequently change the food, giving boiled barley or wheat at different times of the day, and placing an earthenware vessel of thick milk at their disposal. It is advisable to give them any available meat and plenty of green stuff, in addition to the ordinary meal allowance. The birds should now be fast developing into fair-sized plump chickens, and at 12 or 14 weeks one should think of topping them off for killing. For the local markets the odor of lucerne and the redde appearance that meat gives to poultry do not matter, but for private trade or export it is desirable to offer only prime white-fleshed birds, untainted by any strong odor. Therefore, during the last two or three weeks discontinue the lucerne and meat, and give instead every other day about 1lb. of mutton tallow to every 30 birds. Mix this in their bran and pollard rations, which should now be mixed to the constituency of thickened cream. They will consume and digest more. The short time that they are on the sloppy food prevents any internal troubles.

RAPIDITY OF MATURING.

The great point in the successful handling of table poultry is the rapidity in maturing birds right from the shell. The birds must show a substantial gain every week, and it pays to use only the best food. The birds should be bred from big, vigorous, and mature birds of the quick-growing breeds, such as Orpington, Wyandotte, Dorking, pure, or Game crossed. The incubator room should be handy to the brooder-house, and this should not be far from the chick runs. One run should open into another. The houses should be at least 6ft. by 6ft. on the ground space, 4ft. to 5ft. high in front, and partly open. The back should be low enough to allow for a fair fall and the cleaning of the house part. The house should, of course, be movable. For the bigger birds an automatic watering system is an asset.

THE DUCKLING.

Up to four or five days old the duckling can be subjected to the same treatment as the chicken. After this age it rapidly becomes independent, and, instead of making for the warmth, camps around in little clusters. They should then be kept in a well-lighted shed on a sand floor with a litter of straw, and should the nights promise to be cold, confine them in a corner and cover them with a sack. This huddling is rarely necessary after the second week. If the ducks are hatched in the winter I find it a good plan to give from 18 to 20 to a hen. Whilst the ducklings are willing to be mothered by the hen for a few days, they soon find that they can do without the warmth she offers, which is usually at the end of the second week; and most hens have no objection to these birds being removed and a younger lot substituted, particularly if the shifting is done at night. The water and feed vessels should be placed as far apart as the pen permits. The water-tins should be deep enough for the head to be submerged, but covered sufficiently to prevent wading. The food should consist of crumbly mash, half-chaffed green feed, a sprinkling of bran, and the balance pollard. Into this can be worked a little fine grit two or three times a week. A trace of mutton tallow or a little meat can also be added. Probably five feeds could be easily managed by them now, providing the first was as soon as possible after daybreak and the last just at dusk. Following this last feed a fair quantity of green stuff should be provided to last through the night.

SHADE FROM THE SUN.

Ducklings must be shaded from the sun. Like most birds, they like the bright sunshine, but the effect is disastrous. After a few minutes in the sun the birds begin to lose control of themselves. Suddenly a healthy bird sways and topples over, while another commences to circle around. Death usually follows within a short time. If noticed in time, plunge the ducklings into cold water. A few partially recover, but they never seem to thrive as they should do, presenting a lifeless and groggy appearance. The cause of the trouble probably is that the warmth of the sun overheats the blood of the birds and affects the brain. After five weeks old occasional sunnings do not hurt them, but at all times provide plenty of shade. The same trouble is likely to occur if the duckling is left too long without liquid and then allowed to have cold water. This happens mostly in the mornings, when the previous evening's supply has not lasted sufficiently far into the night. At from three weeks to a month old the ducks should be drafted into lots of 10, putting the same sized birds together. In large numbers ducklings, particularly the Pekin variety, are very timid. Often for no reason they will scamper around all night, causing many birds to be maimed. At this stage the meat and tallow allowance may be doubled, and after the fifth week the water should be given only at meal times. A good plan is to give the birds water before starting to mix their feed. They then have sufficient time to clean them-

selves and have a drink, and are therefore able to devote their attentions thereafter solely to the mash, with an occasional swill. With water and food placed before them at the same time the food is apt to be neglected and trodden on.

AT EIGHT WEEKS.

At eight weeks the green feed and meat should be discontinued, and only mutton tallow added—at the rate of 1lb. for 10 birds every other day. At this stage perhaps it is advisable to scald all the bran, and even then not using more than one part to four of pollard. Early in the season, while the weather is cooler, even less bran than this may be profitably used. On the approach of summer the birds often refuse the food which contains but little bran. The ducklings begin to mature at nine weeks, and as soon as their wing feathers are developed pass them out. With proper treatment at 10 weeks the birds, or the greatest portion of them, should be in a marketable condition. Once they are in their prime dispose of them without a day's delay, because in a short while the pin feathers develop and cause the birds to lose condition.

PIN FEATHERS.

To the dresser the pin feathers are a worry, and no matter how carefully the work is done the bird is more or less disfigured. This is undesirable, especially for export. Stock birds should be of Pekin or Aylesbury breeding. Select large two-year-old ducks and mate them to a young drake. The duck-house should be of sufficient width to allow of a row of runs on either side of a sufficiently wide passage which will facilitate cleaning. These runs should be, say, 6ft. by 6ft. within the shed, and a similar space outside, where the birds may be allowed on cloudy and overcast days. Sufficient ventilation must be provided, and the floor high enough to prevent dampness rising. The greatest need of a table poultry man is a big supply of green feed. Lucerne stands out from all others, and another splendid food is Jersey kale, which grows quickly, and will often tide over between the barley and the lucerne crops. Cabbage, silver beet, and maize are also useful food, while rape should not be overlooked, particularly for ducklings. Watch cleanliness and overcrowding. From the producer's point of view the local markets are satisfactory up to the end of the year.

SHIPMENTS TO LONDON.

Possibly the offers for chicks are good well into January, but after that the bottom falls out of the demand, and unless the export trade is fostered and placed on a good footing the table poultry raiser will find he has worked hard for little reward. Many egg and poultry farms are springing up in the State, and unfortunately our breeders have been slow to take advantage of the shipments to London made each year. I have shipped for the last four seasons, and am quite satisfied that the returns are greater than the ruling values in the local market.

IRRIGATION OF LUCERNE.

The Intelligence Officer (Mr. V. H. Ryan) writes :—" Herewith I have the honor to forward for reprint an article on the 'Irrigation of Alfalfa,' compiled by Dr. S. Fortier (Chief of the Irrigation Investigation Office of Experimental Stations, United States Department of Agriculture). The rapid rise of the dairying industry in this State and the value of good lucerne as a fodder for milch cows make it advisable that growers, present and prospective, shall be placed in possession of the latest practical information and advice regarding 'the best methods of irrigated culture and the utilization of water applied to agriculture.'

" In the United States the subject has received careful study for many years, and as the information contained in the following pages meets to a great extent the requirements of local conditions, the Commissioner of Crown Lands (Hon. Crawford Vaughan) directs that the article shall subsequently be published by this department as a special bulletin.

" For the convenience of readers the word 'Alfalfa' has throughout been changed to 'lucerne,' and dollars and cents converted into English currency.

" Mr. S. McIntosh (Superintendent of Irrigation and Reclamation) recommends the article as a valuable treatise on the subject, and by request has supplied the following introductory notes."

INTRODUCTION.

By S. McINTOSH.

" Having perused the Bulletin on the 'Irrigation of Alfalfa,' by Samuel Fortier, of the United States Department of Agriculture, I confidently recommend it as a valuable treatise on the subject, and by request supply the following introductory notes :—

" Alfalfa or lucerne (*Medicago sativa*) as a forage plant of the first order has been known since the dawn of the world's recorded history. It was carried into Greece from Persia in 490 B.C., introduced into Rome 146 B.C., and it has been continuously in cultivation in Italy ever since. Spain and France received it a few centuries later, although some writers are of the opinion that Julius Cæsar is responsible for its introduction into these countries. It was first taken to Northern Africa about the same time as it first appeared in Italy. Centuries later it became general throughout Europe. In the sixteenth century it was imported into America by the Spaniards. We have no authenticated record of its first appearance in Australia.

"The name 'Alfalfa' is derived from an Arabic word meaning 'the best fodder.' This wonderful plant is known throughout the world under a list of different names, which include the following:—Alfalfa, lucerne, French clover, Mexican clover, Lucerne clover, Chilian clover, Brazilian clover, Syrian clover, sainfoin, Spanish trefoil, purple medick, manured medick, medick, isifist, 'medicee medica, herba medica, herba spagna, meilga, alfas-afat, la lucerne, common fodder, snail clover, branching clover, stem clover, monthly clover, horned clover, perennial clover, Burgundy clover, Welsh clover, and Sicilian clover.

"On one farm in North Dakota 217 distinct strains are grown.

"In the past our growers were satisfied to purchase simply lucerne seed, 'Hunter River' for preference, not that they considered it a different strain, but simply that it was acclimatised. To-day the results of practical experiments are proving that the various strains are as distinct as are the different varieties of wheat and other cereals.

"In some degree this was borne out last season on the Murray Bridge Irrigation Farm, as will be seen from the following figures:—South Australian, 12 tons 14cwts. 4lbs. green fodder, 4 tons 1cwts. 96lbs. hay; Hunter River, 10 tons 13cwts. 96lbs. green fodder, 3 tons 10cwts. hay; Peruvian, 9 tons 16cwts. 85lbs. green fodder, 3 tons 4cwts. 7lbs. hay; Provence, 9 tons 5cwts. 92lbs. green fodder, 3 tons 3cwts. 10lbs. hay; Turkestan, 8 tons 18cwts. 51lbs. green fodder, 2 tons 14cwts. 102lbs. hay; Arabian, 8 tons 10cwts. 68lbs. green fodder, 2 tons 15cwts. 22lbs. hay; American, 7 tons 19cwts. 90lbs. green fodder, 2 tons 6cwts. 29lbs. hay. This was derived from the second cut of the season. The crops were grown on the same class of land, under exactly similar conditions, and planted the same day. Results prove the value of acclimatisation and strain, the locally grown seed securing an easy first place, with Hunter River second on the list; but in the same field other strains of Hunter River did not return anything like such gratifying results. The full season's experiments placed the 'Arabian' strain in the premier place, despite the fact that less seed was planted owing to its being a larger grain, in addition to which it was imported direct from Arabia. Half a ton of similar seed has been since imported by the Government and distributed to *bona fide* lucerne-growers throughout the State for the purpose of giving the valuable variety a thorough test. In addition, the Department of Agriculture is planting 10 acres for seed purposes, to ensure the true strain being retained in the State.

"PREPARATIONS OF LAND FOR PLANTING.

"Land intended for lucerne must possess a good drainage to secure anything like successful results. The quality of the soil does not particularly matter, provided it does not contain too high a percentage of clay or alkali. The area should be fallowed at least three months before sowing,

the weeds eradicated, and the soil well worked up with a scarifier, disc, or Acme harrow and pulveriser, and rolled when ready for the seed. With a properly-prepared seed bed from 10lbs. to 15lbs. of good seed is sufficient to ensure a satisfactory stand. The soil should, if possible, contain a sufficiency of moisture to germinate and carry the plant into its fourth leaf. Harrow lightly or brush the seed in and again roll the land with the object of excluding as much air as possible and securing a firm seed bed.

“TIME OF SOWING.

“Fall sowing—*i.e.*, in April and May on fallowed and well-worked soil—is the safest proposition, as it permits the seed to get a fair start, while the ordinary winter rains maintain a good root growth and places the plant beyond the danger of a dry October. Should the district prove subject

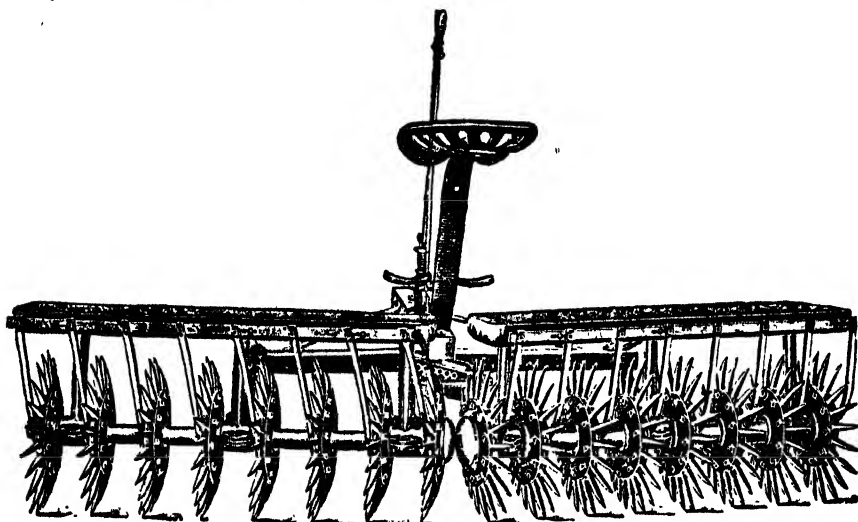


FIG. 1.—ROTARY SPIKE CULTIVATOR.

to heavy frosts, a nurse crop of barley sown at the rate of not more than three-quarters of a bushel per acre is often a necessity. Land containing any appreciable quantity of saline matter should always be sown in the fall, so that the winter rains may hold back the alkali from the soil surface until early in the summer. In the meantime the plant has secured a fair start, and as it can withstand a fairly liberal percentage of salts—provided always the drainage is good and the soil kept moist—satisfactory crops may be expected. For spring sowing the land should be ploughed early in the winter, so as to permit the sun, rain, and frost to properly weather the soil. Sow as early in September as possible to allow the young plants to become established before the heat of summer. No nurse crop is desirable or necessary with spring sowing.

"My recommendation to prospective lucerne-growers is to purchase, if possible, guaranteed true South Australian or Hunter River seed, but in the event of the necessary guarantee not being satisfactory try Provence, Hungarian, or Turkestan. Do not sow the latter on any but well-drained soil. To be on the safe side in buying South Australian seed it is desirable, if possible, to ascertain the source of the original seed.

"Land intended for lucerne under irrigation should be properly graded and possess both a good surface and under drainage. Irrigated lucerne plots should be well cultivated early in the winter and again in August or September.

"The rotary spike cultivator is the most suitable implement to perform this work in a satisfactory manner. When possible, it is always preferable to irrigate lucerne about a week or less before cutting the crop. By following this practice less water is required. There is no danger of scalding the plants in the case of a high temperature attending irrigation after mowing, and the plants commence growing again immediately they are cut."

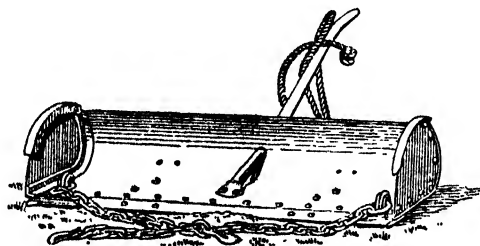


FIG. 2.—APPROVED BUCKSCRAPER.

ARTICLE FROM FARMERS' BULLETIN 373.

(U.S. DEPARTMENT OF AGRICULTURE.)

Experience in the growing of lucerne for more than two thousand years shows that it thrives best in the soil and climate of arid and semi-arid regions. The abundant sunshine, the warmth, and the deep, rich soil prevailing throughout the western half of the United States seem to be well suited to its requirements, and over half a century's experience has shown that there is comparatively little cultivable land in the West on which it cannot be grown. One finds the same varieties flourishing in Imperial Valley, California, 100ft. below sea level, and maintaining a sturdy growth on the San Luis plains of Colorado, 7,500ft. higher. Lucerne makes a remarkable growth in the warm sunshine of Arizona, yet it is rarely injured by cold in Montana.

One cannot well overestimate the importance of lucerne to western farmers. The lucerne field and the lucerne stack provide the best means of protecting

stock against enormous losses by starvation when the excellent pasturage available throughout the greater part of the year fails either through drought in midsummer or by being covered with deep snow in midwinter. A single ton of lucerne may save the lives of many head of stock by providing feed during short periods of cold, stormy weather. Lucerne cannot be excelled as a preparatory crop on soils that have long been unproductive. Likewise, it maintains the fertility of soils naturally rich in plant food, and if used as a base of rotation makes possible abundant crop yields of various kinds. In 1906 the chemist of the Colorado Experiment Station estimated the fertilising value of the stubble and roots of mature plants at £7 per acre when measured by the commercial value of artificial fertilisers on the market. Moreover, the yields are exceptionally high when irrigation, favorable climatic conditions, and proper treatment are combined. Seven tons of cured hay at three cuttings are obtained from the best fields of Montana, while frequently 9 tons in five cuttings are harvested in California. This large tonnage, together with its high feeding value and the fact that it is consumed by practically all farm animals, makes it not only a convenient and useful crop to the grower, but a highly profitable one as well.

Notwithstanding its present importance and great value in irrigation farming the profits on the area now in lucerne can be greatly increased if more care and skill are exercised in growing it. The western irrigator has seldom been able, financially, to dig his ditches and prepare his fields in such a way as to insure the most efficient irrigation and the highest profits. In consequence, valuable water is wastefully applied to land that is in no fit condition to be irrigated. On the large acreage in irrigated lucerne this amounts to an enormous loss. This fact, considered in connection with the importance of this crop, the rapidly increasing area devoted to its growth, and the large number of farmers who are settling in the West and who will be for years dependent in a large measure on lucerne for a livelihood, would seem to warrant the collection and publication of any information designed to improve the present practice.

As its title implies this publication deals with but one feature, that of irrigation, and its scope is necessarily limited to irrigated lands. There has been no attempt to present or discuss at any length other phases of the general subject of lucerne-growing, and wherever mention has been made of these it has been only to show their relationship to irrigation.

In the examination of lucerne fields and the collection of the data necessary for this publication, advantage was taken of the organisation of the irrigation investigations of this office, which is well adapted for such a purpose. Through the State and Territorial agencies of that division and through co-operation with the members of State experiment stations and the State engineers it was possible to obtain with a high degree of accuracy the conditions and irrigation practice with reference to this crop throughout the entire arid region.

IRRIGABLE LANDS ADAPTED TO LUCERNE.

Perhaps the most essential conditions for the production of lucerne are abundant sunshine, a high summer temperature, sufficient moisture, and a rich, deep, well-drained soil. All of these essentials, save moisture, exist naturally in the arid region of the United States, and when water is supplied it makes the conditions ideal. Although lucerne can be successfully grown under a wide range of soil conditions, yet all western lands are not equally well adapted to its growth. For this reason those who are seeking such lands with a view to their purchase should first make a careful examination of the character and depth of the soil, its behaviour when irrigated, the slope and evenness of the surface, the presence of injurious salts, and the facilities for drainage.

One of the best indications of the character of the soil is the native vegetation. When sagebush, buffalo grass, or cactus is found on a tract it is reasonably certain that the soil is fertile, easily tilled, and well drained. On the other hand, the presence of greasewood, saltwort, salt weeds, or similar plants is indicative of a heavier soil, less easily cultivated and irrigated, and containing more or less of the injurious salts usually grouped under the common name of alkali.

In arid regions most cultivated plants are deep rooted. They draw their supply of plant food and moisture from considerable depths, and the deeper the soil the larger is the feeding ground for the roots and the greater is the capacity to store water. The presence of any impervious stratum lying between the first and fifth foot prevents deep rooting and the storage of moisture. A hard stratum lying between the fifth and tenth foot is likewise injurious, but to a less extent. The character of the subsoil may be readily determined by boring holes, with a suitable soil auger, to a depth of 10ft. if necessary, and taking samples of soil at different depths. It will be possible usually to find under irrigation in near-by fields, soils similar to those being examined, but if this is not possible a trial may be made on a small scale to determine how the soil acts under irrigation. In general, sandy loams irrigate well; clay is hard to cultivate when wet, does not absorb water readily, and bakes and cracks when drying; while a soil which is too sandy will not retain sufficient moisture to maintain crops.

The most favorable condition for irrigating is a smooth surface, with a uniform slope of 10ft. to 20ft. to the mile. Such land costs little to put into shape for the spreading of water over it, and the slope insures good drainage. Sometimes the land is cut up by ravines which increase the labor and cost of putting water upon it, or it may have too much or too little slope. In other cases it is full of buffalo or hog wallows which are difficult to bring to an even grade. If land which is naturally smooth on the surface and of the right slope costs £1 per acre to prepare for irrigating, hog-wallow land may

cost £3. Besides, some hog-wallow land is inferior in quality, frequently being charged with injurious salts.

Lastly, good drainage is essential for a permanently productive irrigated farm. It is practically impossible to supply crops with sufficient water for the best growth without applying so much that some will seep into the sub-soil. Unless this can flow away the level of the ground water will rise until it comes near the surface and drowns out crops, and perhaps cause an accumulation of alkali. If the natural drainage is not good it must be supplied artificially, but this need not be done until a few crops have been raised, for the reason that it is not possible to tell until after irrigation where the drains should be placed to drain the land most effectively.

The frequent failures to get a good stand of lucerne in the humid portions of the United States have led some writers on this subject to prescribe within somewhat narrow limits where and under what conditions this forage plant can be grown successfully. That this view is not correct as regards the irrigated portion of the United States is amply shown by the fact that it is grown successfully in every State and Territory of the arid region, in localities which are not only widely separated but possess many radical differences in the way of rainfall, temperature, altitude, topography, and soil.

PREPARATORY CROP.

Experience has shown that it is difficult in the course of six months or a year to secure a good stand of lucerne on raw land that has been covered by a desert growth. This is true particularly of rough, uneven land, on which crop rotation is not to be practised. It is likewise true of land thickly covered with brush. It has been found impracticable in most localities to secure a smooth, well-graded surface where fresh roots interfere with the proper use of all grading and levelling implements. The same is true of hog-wallow land, where considerable soil has to be removed from the high places and deposited in the low places. It takes time and a second preparation of the surface before fields of this character can be put in good condition for the growth and irrigation of lucerne. If crop rotation is to be followed the necessity for a preparatory crop is not so urgent, since the lucerne will soon be ploughed under to give place to another crop. In northern Colorado, where lucerne usually follows either potatoes or sugar beets, the surface is not ploughed, but merely harrowed or disced in the spring just before seeding. If the surface is uneven it is smoothed and levelled by means of a float or drag before the seed is put in. In south-western Kansas it is likewise considered best to plant lucerne after some cultivated crop which has held the weeds in check. The land is ploughed in the fall (autumn) to a depth of 6 in., double-disced in the spring after the weeds have started, and is subsequently harrowed. In the vicinity of Los Banos, Cal., new land is almost invariably sown to barley or corn for two seasons before seeding

to lucerne. In Utah wheat or oats is preferred as a preparatory crop. The chief purpose of all such preparatory grain crops is to allow fresh roots of the original plant covering to decay, filled-in spots to settle, high places denuded of the upper layer of soil to weather, and in general to prepare a well-pulverised seed bed in a smooth, well-graded field.

METHODS OF IRRIGATING LUCERNE.

The methods of applying water to lucerne differ widely because of diversity in soils and subsoils, in climate and topography, in the nature of the water supply, the size of the farm, the amount of money available for preparing the land for water, the prevailing crops grown, and the early training and environment of the irrigator. The standard methods have been grouped under the following heads, namely, the border method, the check method, flooding from field laterals, furrow irrigation, and other less common methods, with various modifications of each.

In passing it may be said that the usual order is to locate and build the farm ditches first and prepare the land afterwards. In this bulletin it has been deemed best to describe the methods in use and then to consider the location and construction of farm ditches. After one has a general knowledge of the various ways of applying water and of the size and character of the ditches required for each method he is in a better position to understand the proper methods to adopt in building farm ditches. This subject will therefore be treated separately under its own heading.

THE BORDER METHOD.

Essentially the border method consists of the division of a field or tract into long, narrow strips or lands by low flat levees which usually extend in the direction of the steepest slope and confine the water to a single strip. The bed of each strip is carefully graded to a uniform slope, although the slope may change to conform to the contour of the natural surface. The water to irrigate each strip is taken from the head ditch extending across the upper edge of the field, and is controlled by an outlet box or border gate, although the gates are sometimes omitted to save in first cost of preparing for irrigation. Check gates, canvas dams, or metal tappoons are used to hold up the water in the head ditch to cause it to flow into the borders.

This method is confined chiefly to the irrigation of lucerne and grain, and in its various modifications is used extensively in Arizona, California, and, to a less extent, in Idaho, Montana, and other Rocky Mountain States. It can be used best under canals which deliver water to users in large streams, since the smallest head that can be applied successfully is seldom less than 2 cub. ft. or 3 cub ft. per second, but heads of 5 cub. ft. to 10 cub. ft. per second are the rule. It is adapted especially to light, open soils, into which water percolates rapidly, as the use of a large stream confined between borders

makes it possible to force water over the surface without great loss by percolation.

On the University Farm at Davis, Cal., the borders or lands average about 50ft. wide by 900ft. long. Each levee has a base 7ft. wide and is 12in. high, when newly made, but settles to about 10in. before the first crop is harvested. The bed of each strip is levelled crosswise and slopes regularly from top to bottom. In preparing the surface of this field the barley stubble was burned then the soil was disced and roughly graded. The location of each border was marked out either by a drag or by making a furrow. Sufficient earth to form the border was obtained by skimming the surface with scrapers. The scraper teams began next to the head ditch and worked down. They crossed and recrossed the field at right angles to the borders, and as a scraper passed a border marking it was dumped. Each scraper width of the borders

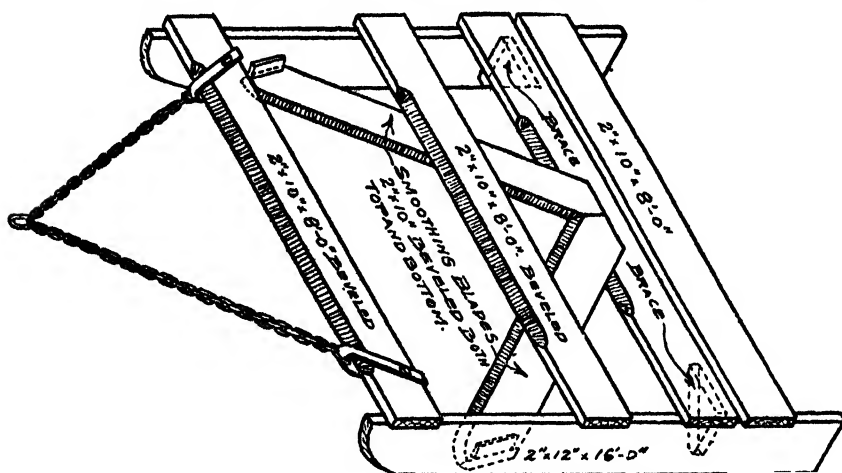


FIG. 3.—LEVEE SMOOTHER MADE BY H. I. MOORE.

was made up of two loads, but the last load overlapped the first by half the width of the scraper. The surface of each border was then levelled to within 0-1ft. or 0-2ft. of accuracy. The levees when first built were rough, irregular, and steep. They were cut down to a uniform grade by a home-made device called a planer, shown in Fig. 3.

In Imperial Valley, California, a 40-acre tract is divided in 22 lands each 60ft. wide and one-quarter of a mile long. When the slope is too steep the lands run diagonally across the tract. In order to lessen the first cost the material for the borders, instead of being scraped from the high portions of the lands, is taken from the sides of the borders. This creates hollows in which water may collect, makes the mowing and raking more difficult, and frequently lessens the yield. Such borders may be made by the use of the plough and ridger (Fig. 4). In this method a narrow strip is first ploughed

and then the ridger, drawn by a number of horses, forms the loose earth into a ridge. The cost per acre for preparing the land by the border method in this valley varies all the way from £1 to £4, depending on the character of the native vegetation and the size and number of the hummocks. When creosote bushes and mesquite trees are surrounded by wind-driven sands the cost may run as high as £8 per acre.

In Salt River Valley, Arizona, the customary method of preparing the land for lucerne is to remove the brush, plough the high places, and roughly level the surface with suitable scrapers. Then the borders are marked off from 30ft. to 50ft. apart. The spacing depends on the porosity of the soil, the configuration of the land, and the head of water available. After forming rough borders by means of four plough furrows thrown together to form a ridge, a disc or spring-tooth harrow is run lengthwise of the lands. The

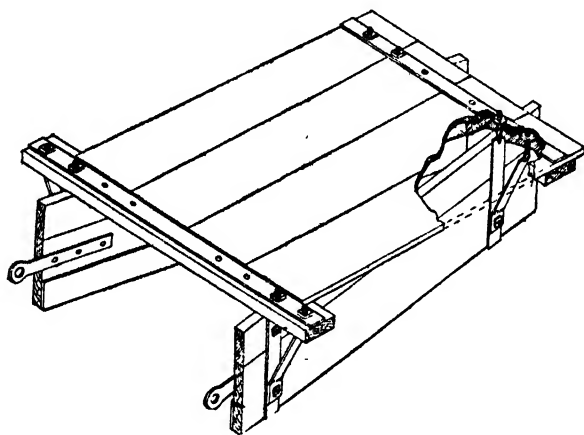


FIG. 4.—ADJUSTABLE RIDGER.

borders are then crowded with a V crowder, and usually a leveller is run transversely to the borders to round them off. The land then receives a heavy irrigation, and when dry enough to work is again disced or harrowed and seeded. Such borders when first made have a base of about 3ft. and a height of 1ft., which settles to about 9in. The length of the borders or lands varies from one-eighth to one-fourth mile.

The farmers on the Roswell Bench on the south side of the Boise River in Idaho, make the levees 66ft. apart and 300ft. to 1,300ft. long, depending chiefly on the topography of the land. The land is first levelled with scrapers, then ploughed and harrowed, after which the borders are marked off and thrown up by ploughing two to four furrows with a heavy plough. Before seeding a home-made planer is dragged lengthwise and crosswise of the lands in order to fill up the hollows by cutting off the high places. The cost of

preparing land in this way and seeding varies from £2 to £6 per acre, depending upon the roughness of the surface.

One of the great advantages of this method is that it enables one man to use a large stream of water and irrigate a large area with a minimum of labor. The size of streams used in the Rillito Valley in Arizona varies. A head of about 100 miner's inches is turned into a plat of land 30ft. wide, and takes one to three hours to reach the lower end, 660ft. distant. Two men working 12 hours each, with this head of water, will irrigate in 24 hours 12 to 15 acres, at a cost of 10d. to 1s. per acre for each watering. In the extensive lucerne fields belonging to the Butterfield Live Stock Company, of Weiser, Idaho, the head ditch has a capacity of 150 to 500 miner's inches, divided into three or four streams, and permitted to flow down as many lands until the soil is moistened to a depth of several feet. Each field receives three such waterings in a season. On the lucerne fields in Yolo County, Cal., the natural slope of the land is about 1ft. in 400ft. On the shorter lands the head used is seldom less than 6 cub. ft. per second, but three and four times this quantity is often applied to the longer lands. On fields well laid off, with good border gates and border levees, two men can irrigate 20 to 40 acres in 12 hours, the area within these limits depending chiefly on the size of the irrigating head. In Imperial Valley, California, the size of the head used varies from 50 to 600 miner's inches. In using a head of 500in. it is customary to divide it among five lands. With such a head it is not unusual for two men working 12-hour shifts to irrigate 80 acres in 24 hours.

THE CHECK METHOD.

The essential features of the check method of irrigation consist in surrounding nearly level plats of ground with low levees, and in making provision to flood each by means of a ditch and check box or gate. The enclosed spaces may be laid out in straight lines in both directions, thus forming with their levee borders a series of rectangles, or the levees may follow more or less closely the contour lines of the natural surface of the ground, thus forming contour checks. The most favorable conditions are a light, sandy soil on a comparatively even slope of 3ft. to 15ft. to the mile, abundantly supplied with water. This method is also used on heavy soils, where it is necessary to hold the water on the soil to secure its percolation to the desired depth.

In California not only does the form of the checks vary, but their size as well, some of the smaller being less than one-half an acre in area, while some of the larger contain more than 10 acres.

(To be continued.)

OUR FLOCKS AND HERDS.

The following particulars concerning live stock in South Australia have been supplied by the Government Statist :—

STRENGTH OF FLOCKS, DECEMBER 31st, 1909.

	Horses.	Cattle.	Sheep.	Pigs	Gonts.	Other.
South Australia Proper	230,405	344,034	6,432,038	80,410	13,349	5,565
Northern Territory	23,479	414,046	43,393	1,387	20,951	526
State, 1909	253,884	758,080	6,475,431	81,797	34,300	6,091
State, 1908	235,136	748,368	6,952,499	81,165	35,575	6,617

INCREASE, 1909 OVER 1908.

	Horses.	Cattle.	Sheep.	Pigs.
South Australia Proper	17,020	3,658	- 466,413	1,956
Northern Territory	1,728	6,054	- 10,655	- 1,324
Total Increase State	18,748	9,712	- 477,068	632

INCREASES AND DECREASES, SOUTH AUSTRALIA PROPER.

Horses.—The substantial increase in horses (17,020) is most satisfactory. Of this number 13,532 are draught horses, thus indicating the rapid expansion of the farming industry.

Cattle.—While there is a decrease of 830 in other cattle, there is an increase of 4,488 in dairy cows, the net increase of cattle being 3,658.

Sheep.—The sheep number 6,432,038, being 466,413 less than the previous year. The decrease in counties was 413,295, and outside counties 53,118.

In view of the heavy decrease, the precaution was taken to verify the returns by communicating with a large number of flockowners. The following are the chief contributing causes to the decrease :—

1. The ravages of wild dogs and foxes.
2. Drought and natural causes.
3. Reduced flocks in the counties owing to increased cereal cultivation.
4. Heavy slaughterings and bad lambing.

Pigs.—For several years heavy decreases have been recorded in pigs, but this year there is an increase of 1,956—the total being 80,410 (78,454).

DECENNIAL INCREASE (1900–1909).

As will be observed from the following table, there has been a substantial increase in our flocks during the last decade :—

	Decennial increase in -		
	Horses.	Cattle.	Sheep.
South Australia Proper	63,615	129,273	1,196,818
Northern Territory	10,917	156,379	— 4,634
Total Increase State.....	74,532	285,652	1,192,184

SLAUGHTERINGS.

It may be mentioned that the slaughterings for 1908 were considered heavy, being largely in excess of any previous year, but the following particulars of the slaughterings for 1909 for home consumption, export, and preserving show increases far in excess of the year 1908 :—

Sheep and Lambs.—1,303,501 (1,212,868), an increase of 90,633.

Cattle.—82,445 (67,369), an increase of 15,076.

Pigs.—57,610 (58,909), a decrease of 1,299.

MORTALITY (SOUTH AUSTRALIA PROPER).

Sheep.—The losses through dogs and foxes were very heavy during the year. Approximately 100,000 were lost in this way, against 76,000 the previous year. In addition, nearly 200,000 were lost from various other causes, the chief being the absence of grass at the period of lambing in the areas beyond counties.

Horses.—5,687 (6,800) ; decrease, 1,113.

Cattle.—11,023 (11,133) ; decrease, 110. Of this number 2,173 deaths were attributed to dry bible.

VALUE OF PASTORAL EXPORTS, 1908 AND 1909.

The net value of exports of pastoral products—sheep, cattle, and horses (living), meat (frozen, &c.), skins and hides, tallow, wool, &c.—for the year 1909 amounted to £2,232,215, against £2,158,752 in 1908.

The chief item was wool, the following being the figures for the two years :—
1908, greasy and scoured, 146,842 bales = 46,334,258 lbs., valued at £1,629,662;
1909, greasy and scoured, 149,546 bales = 46,533,849 lbs., valued at £1,815,653.



ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, August 10th, there being present Messrs. J. W. Sandford (Chairman), C. J. Tuckwell, J. Miller, Col. Rowell, G. R. Laffer, W. Gillard, C. J. Valentine, and R. J. Needham.

Mr. S. McIntosh forwarded report on the growing of lucerne without irrigation, as requested at previous meeting. [Report appeared in the August issue.—ED.] A vote of thanks was accorded to Mr. McIntosh, members expressing the opinion that the report would prove valuable to stockowners.

The Secretary referred to resolution passed at the last year's Congress that the Board should endeavor to arrange for a place in Adelaide where delegates could arrange to meet one another. He had made inquiries, and had received the offer of a room in a convenient centre in one of the leading restaurants under favorable terms. On the motion of Mr. Laffer it was resolved that the Secretary be empowered to make necessary arrangements.

Approval was given to the formation of a Branch at Willowie, provided suitable names are submitted, and to the formation of a Branch at Blyth, with the following gentlemen as members :—Messrs. W. J. Ninnies, H. R. Mügge, E. C. Deland, A. L. McEwin, W. Pratt, O. Eime, C. H. Zireck, R. M. Longmore, J. C. Schulze, T. Roberts, J. J. Clarke, W. F. Reinke, M. Williams.

T. Dunstone, M. Coleman, J. S. Knowles, J. Pratt, M. S. Longmire, C. H. Davis, R. Buzacott, M. Vogt, jun., A. A. Schulze, F. Wiltshire, C. P. Schuster, H. H. Gell, and F. T. Pedler.

The following gentlemen were approved as members of the undermentioned Branches :—Messrs. W. Loller, Naracoorte ; A. Ramsey, Miltalie ; C. H. Martin, Moonta ; R. Foster, Millicent ; R. Heaslip, B. Flavel, H. V. Sargent, G. Miell, Crystal Brook ; J. J. Miller, Penong ; T. N. Rickaby, R. Baumgartner, R. Dainty, L. Goldfinch, Meningie ; O. G. Rechner, F. Y. Aldenhoven, M. F. Rohrig, Yorketown ; W. G. Hamilton, S. Ben, C. Cox, Beetaloo Valley ; A. McDonald, Meadows ; H. H. Evans, Minlaton ; W. C. Brook, W. Collins, L. Haynes, J. Chapman, Orroroo ; F. C. Chaple, H. Dix, Clarendon ; R. P. Sawers, E. Travers, Whyte-Yarcowie ; J. C. Colebatch, W. Crawford, T. Eckerman, P. Manning, R. Rex, Saddleworth ; O. Ahrens, Wilkawatt ; T. Forrest, Yallunda ; A. J. Bray, Butler ; S. A. Wilkins, F. Barclay, W. P. Barclay, Shannon ; G. Attenborough, H. Newmann, J. Keen, J. W. Disher, A. Disher, G. Johnston, Woodside ; J. McAvvaney, Redhill ; V. V. Roberts, W. Spicer, Lameroo ; J. Dux, Clare ; C. W. Smelt, Pine Forest ; D. O'Loughlin, Arden Vale and Wyacca ; J. P. Tonkin, A. E. Tonkin, C. E. Tonkin, V. A. Osborn, Sherlock ; D. C. Murray, Kingscote ; E. D. Webb, R. N. Davey, W. Mulrooney, C. Place, J. Chandler, W. Watson, C. B. Bartlett, sen., J. MacArthur, A. McGuire, C. Tolhurst, Merghiny ; F. Berannack, Utera Plains ; A. C. Dawkins, W. Rice, Gawler River ; V. Clarke, J. Wilson, Kingston ; J. Wallace, M. Corcoran, F. Moten, W. Gunn, E. Mill, Amyton ;

In reply to Col. Rowell, the Secretary stated it had been ascertained that there was no power to extend the boundaries of districts quarantined on account of the presence of Irish blight to include our Northern Areas. Only districts infected by the disease could be quarantined. Under the instructions of the Minister a Bill which would give power to the State authorities to deal with the matter had been drafted and would probably be introduced at an early date. On the motion of Col. Rowell it was resolved that in view of the near approach of the tomato season the Hon. Minister be urged to expedite the introduction of the Bill.

Mr. Miller referred to the proposal of the Minister to establish a school where boys could be trained to farm work. He was sorry that the Agricultural Schools which were established on his suggestion had been abandoned. At the various Continuation Schools in country districts it was noticeable that agriculture was not touched. Col. Rowell said that while every school teacher was not competent to teach agriculture he thought there should be no difficulty in obtaining a man to visit certain schools regularly to give the elder students instruction. Mr. Laffer thought that room could be found for many lads without any agricultural training on farms and orchards if the boys were available. It was decided that it be a suggestion to Congress sub-committee to place the subject on the agenda paper.

VINEYARD PRODUCTION, 1909-10.

WINE, CURRANTS, RAISINS.

The Government Statist has furnished for publication the official yields from our vineyards for the past year. In several instances these show decreases on the previous year's figures, but not to the extent that was anticipated from the somewhat unfavorable weather conditions of the late summer and early autumn.

Vineyard Production, 1909-10, in Comparison with 1908-9.

Division of State.	Area of Vineyards.		Total Grape Production.		Wine Made.	
	1908-9.	1909-10.	1908-9.	1909-10.	1908 9.	1909-10.
	Acres	Acres.	Tons.	Tons.	Galls.	Galls.
I. Central	17,102	17,150	26,207	22,072	2,890,247	2,434,247
II. Lower North	4,340	4,585	7,648	8,320	164,000	121,050
III. Upper North	136	166	234	191	—	—
IV. South-Eastern	383	334	546	379	78,000	14,500
V. Western	70	56	62	78	—	—
Total State	22,031	22,271	34,697	31,040	3,132,247	2,569,797
Increase	—	240	—	—	—	—
Decrease	—	—	—	3,657	—	562,450

Division of State.	Currants.		Raisins—		All Other.
	1908-9.	1909 10	1908 9	Sultana. 1909-10	
	Cwts.	Cwts.	Cwts	Cwts.	Cwts.
I. Central	11,034	15,808	5,471	1,863	5,877
II. Lower North	13,266	20,036	22,530	9,432	10,634
III. Upper North	14	47	5	1	—
IV. South-Eastern	25	—	1	—	—
V. Western	110	161	—	—	1
Total State	24,449	36,052	* 28,007	11,296	16,512
				27,808	
Increase	—	11,603	—	—	—
Decrease	—	—	—	199	—

* For 1908-9 "Sultana" and "All other" Raisins were not separately collected.

Vineyard Production, &c.—continued.

	1908-9. Tons.	1909-10. Tons.
Approximate disposal of grape crop—For Wine.....	22,303	17,363
Table.....	3,214	2,496
Drying	9,180	11,181
Total ..	34,697	31,040

These tables show a falling off of 3,657 tons in total production of grapes, of 562,450galls. of wine made, and 199cwts. of raisins. On the other hand acreage under vines has increased by 240 and currant production by 11,603cwts.

The next table, showing production in Victoria, affords an interesting comparison. Here there has been a serious decrease in area under vines, due, doubtless, to the ravages of phylloxera; also in wine made and raisins other than sultanas. These latter, as well as currants, show very marked increases. Except in respect to raisin production, the South Australian figures are now a long way ahead of Victorian production.

VICTORIAN VINEYARD PRODUCTION.

Year.	Area.	Total Grapes.	Wine.	Currants.	Sultanas.	Other Raisins.
	Acres.	Tons.	Galls.	Cwts.	Cwts.	Cwts.
1908-9	24,430	28,084	1,437,106	11,929	32,102	37,434
1909-10	22,768	27,441	991,941	27,408	49,810	31,234
Increase	—	—	—	15,479	17,708	—
Decrease	1,662	643	445,165	—	—	6,200

SOUTH AUSTRALIA.

Average Annual Wine Production for Five Years.

1905-6 to 1909-10 = 2,540,194galls.

Increase of 1909-10 over average vintage for five years = 29,603galls.

Valuation of Vineyard Production.

	1908-9.	1909-10.	Decrease.
Wine made, table and dried grapes..	£403,153	£398,426	£4,727

Wine in Stock.

	Galls.
June, 1909	5,081,660
June, 1910	4,971,658
Decrease	110,002

Wine Exported Last Two Years.

Year.	Gallons.	Value.
1908	760,526	£123,957
1909	1,045,678	156,083
Increase	285,152	32,126

The next table, showing imports into the Commonwealth of currants and raisins, is of considerable interest. In comparing these figures with those of production, it must be kept in mind that the effect of any increase in production for 1909-10 will be reflected in the imports of 1910, and not those of 1909.

IMPORTS INTO COMMONWEALTH.

Year.	Currants.		Sultanas.		Other Raisins.	
	Lbs.	£	Lbs.	£	Lbs.	£
1908.....	5,390,965	52,778	116,795	1,945	69,796	1,878
1909.....	6,363,343	60,106	815,940	8,584	108,356	1,855

Imports of currants show an increase of 1,000,000lbs. in weight over the previous year; this, however, is discounted by the fact that imports for 1907 reached 7,330,000lbs. How much of this heavy import was due to anticipated increase in the tariff it is not possible to say. Possibly the increase in sultana imports may have been affected in the same way.

The last table is of special interest to currant growers, showing production (in round figures) of currants in South Australia and Victoria during the past eight years.

PRODUCTION OF CURRANTS IN VICTORIA AND SOUTH AUSTRALIA.

	Victoria Lbs.	South Australia. Lbs.
1902-3.....	416,000	547,000
1903-4.....	839,000	1,165,000
1904-5.....	670,000	1,424,000
1905-6.....	717,000	1,630,000
1906-7.....	1,314,000	1,608,000
1907-8.....	1,170,000	2,235,000
1908-9.....	1,330,000	2,733,300
1909-10.....	3,069,700	4,037,900

These figures show how enormously the production of currants has increased in the two States during the past eight years. The 1902-3 figures appear abnormally low, however; but taking 1903-4 as a fair crop we have an increase of from 2,004,000lbs. in 1903-4 to 7,107,600lbs. in 1909-10.

On the other side import statistics show that in 1903 (which year corresponds to 1902-3 in production) the Commonwealth imported, in round figures, 4,500 tons of currants, while last year the total was 2,662 tons. Another, and perhaps the most important view of the position, is that in 1903 production and imports totalled 4,950 tons; in 1909 the total was only 4,481 tons, notwithstanding the marked increase in the prosperity of the country. It is true these figures are only approximate for consumption, as the "carry-over" from one season to another is not known. They indicate, however, that the consumption of currants in the Commonwealth is practically at a standstill, and that profitable extension of local production is, to an extent, limited by the amount of our imports. As the 1909-10 crop was 1,354 tons in excess of the 1908-9, it will be seen that there is every prospect of the local production overtaking local consumption within the next few years, unless means are adopted to encourage the use of currants to a greater extent.

BREEDING BEES BY SELECTION.

By T. E. WHITELAW, Inspector under Foul Brood Act.

All breeders of animals know that special characteristics tending to the improvement of a race can be multiplied and intensified by the judicious manipulation of man in the matter of breeding from selected strains. By continually choosing only those types for reproduction that show the required propensities, the race will expand in quality almost beyond recognition. What is applicable to one animal can often be applied with advantage to another; and the beekeeper, ever on the path of progress, has for years past acknowledged the importance of selecting his bees for breeding purposes, so that his apiaries are composed only of those strains that yield the most profit. The man who carries this into practical operation is always foremost in his line of business.

The ideal bee must possess prolificness, stamina, longevity, always excelling as a honey-gatherer, working early and late in the day. It is an experience which a stranger never forgets to be amongst the hives of a large apiary in the early morning, just as daylight is appearing, and hear the subdued but insistent hum of thousands of bees thronging their way through the timber, about to commence their daily toil. The possession of good wintering qualities is a necessity, and naturally these to a certain extent are dependent on the characteristics before mentioned, prolificness, stamina, and longevity. The colony that comes through the winter strong and sturdy, possessing a young queen—prolific and well developed—will gain the proper balance of population at the right time, just prior to the commencement of the honey flow. They should be good builders of comb and maintainers of a compact brood nest. Gentleness when under manipulation is important to the beekeeper who desires to work under the easiest and happiest conditions. It must, however, be borne in mind that the bee that is ever ready to defend its home is often in many instances a honey-gatherer of the best kind.

For the permanent establishment of a good strain it is essential to breed continually from selected parents, male and female, through a series of successive generations. The choice of the female side is a simple matter, but the control of the male element presents a difficulty not easy to overcome owing to the fact that copulation takes place in the air remote from the hive—an occurrence which has only been observed on a few occasions. Artificial fertilisation with selected drones in confinement has never been proved a practical success, the performance in full vigorous flight being evidently

needful for the best results. Some of the methods used by queen-breeders for the accomplishment of this point are as follows :—

(1) By raising or preserving drones out of season, so that fertilisation is performed by the selected drones when strange drones are not about.

(2) By removing the virgin queens and drones in mating hives to remote districts where there are no other bees. In thickly populated countries this cannot usually be attained, but in certain portions of Australia it is a very possible method.

(3) By trapping all undesirable drones in the apiary so that selected drones predominate.

When breeding bees it must be remembered that they supply an instance of parthenogenesis in insects. This is reproduction without sexual intercourse, and though known in other insects was not associated with bees until Dzierzon brought forth the fact in 1865. It has been generally accepted as a true theory. A virgin queen if rigorously excluded from intercourse with a drone will eventually, after a lapse of time, commence to lay eggs, but these always produce drones and never workers. The drone therefore has a mother and grandparents, and yet cannot claim a father. An Italian queen when mating with a black drone will rear workers that partake of the two races, but the drones will appear as pure Italians. The eggs produced in the egg-bearing follicles of a queen's ovaries are all the same, but an egg intended to produce a worker has injected into it, when passing down the oviduct, a spermatozoon derived from the drone. Such an egg laid without this injection would produce a drone.

In selecting drones for breeding purposes do not go to one of your best hives and obtain the drones from that under the impression that its characteristics will be reproduced. The work of that hive was performed by the offspring of a queen and a drone, and the drones from that hive will only promote the characteristics of the queen side. To know the points those drones would promote the work of the hive that produced the queen must be studied, *i.e.*, the grandparents.

In rearing queens careful selection should be made, for the queen is essentially the vital spirit of a colony producing the working force, and is therefore indirectly the honey-gatherer. A queenless hive of bees, if left to their own unaided resources, will in many cases select worker larvæ to rear a queen from, which has already passed into the weaning stage that such larvæ undergoes, and a queen of a very inferior grade will be the result. The finest queens are those produced from young mothers, for a queen is in her most perfect state soon after she has commenced to lay. A good queen will not only keep pace with her workers while preparing the colony for the coming season, but must actually force them to make room for her. The better the queen the larger the amount of honey obtained, provided she has got

the hive strong just before the main honey flow ; after that she has to simply keep pace with the wear and tear of the working force.

For extracted honey the Italian bees hold the premier position, possessing as they do great prolificness and honey-gathering capabilities, being untiring workers on a light honey flow. They are the best strain for resisting the wax moth. Their gentleness and quietness on the combs is well known. The black German bee is more suitable for cold climates, and where there is a demand for section honey ; then the extreme whiteness of their cell capping brings them to the front. The nature of the Carniolian bees closely resembles that of the Italian, being if anything more prolific and more gentle. They have the reputation of being excessive swarmers, but in the hands of a capable beekeeper this cannot be considered very detrimental, as it is simply a matter of control. They seal their combs with a white capping, and use wax in the place of propolis, a point which assists easy manipulation. They are somewhat difficult to obtain true to type, but their points, I think, merit a trial in this State.

Whatever strain the breeder raises his queens from the general principle of raising queens of the highest excellence should be borne in mind. They should be reared under conditions as closely resembling those reared naturally during the swarming period. The larvæ should be the youngest possible. The hive should be crowded with young bees, and, above all, during a period when food is abundant. It is a mistake to rear too many cells at one time, as the quality of the queens produced is apt to suffer.

The question of breeding bees by selection is a somewhat difficult one to the beekeeper who runs a large number of colonies for honey production, for during the season his time is fully occupied with his ordinary work amongst the bees, and usually cannot devote much time to breeding bees by selection. Many of the largest honey producers in America prefer to purchase queens from reputable breeders in preference to rearing their own, so that the whole time during the season can be devoted to honey-production.



Hayfield near Adelaide.

THE WHEAT MARKET.

During August the local wheat market was practically stationary, the price gradually rising from 3s. 8d. to 3s. 11d. and falling again to 3s. 9d. in sympathy with the London market. During the first few days of September there was a firmer tendency both in the home and the Australian markets, and a little business was done at 4s. per bushel on trucks at Port Adelaide. The table of prices on the next page is remarkable for the ready response in the three principal Australian markets to London advices.

The chief factor in the improvement of the market has been the adverse reports respecting American crops; but other countries have better prospects than was the case last year, and the Chicago Corn Exchange estimates the world's available wheat at 51 million bushels more than last year.

Beerbohm's Evening Corn Trade List of July 22nd writes on the wheat position as follows:—“The change in the world's crop prospects as compared with the early part of June, has been remarkable, not to say sensational. At that time there was every prospect, provided ordinary agricultural conditions prevailed up to harvest time, that the yield would be about equal to last year's record outturn, and there were many members in the trade who seriously thought that the level of prices in the coming season would be well under 30s. The deterioration in crop prospects has been so great that the situation has completely changed, and we are already well over the 35s. level for most descriptions of wheat, and approaching the 40s. level for others. The estimated yield in the U.S. is now put at fully 15 million quarters less than indicated five or six weeks ago, and in Canada at six to seven million quarters less. Advices from Russia are now more unfavorable than at any previous time this season, but it is quite possible, in view of the glowing accounts earlier in the season, that present reports are too pessimistic, and that comparison is being made with the bright prospects earlier in the year, and not with a normal crop. In France the fine weather so much required is still wanting, and there is a general disposition to reduce this year's probable yield to below 40 million quarters. No material change has been made in the estimates of the Roumanian, Hungarian, and German crops, which are expected to give a much better outturn than last year. The average yearly consumption in France is about 43½ million quarters, and, provided this year's crop is not much under 40 million quarters, this quantity, with the supplies to be received from Algeria, added to the reserves of old wheat (which are believed to be fairly liberal), would probably be almost sufficient for the year's requirements. The weather in the near future will probably decide whether France has to import or not.”

In its issue of August 5th the same paper says—“As far as one can judge at present, the course of prices will depend, as much as anything else on what quantity of wheat Russia can export and how much wheat France will require to import, and these are both very uncertain quantities at present; later on the Argentine will, in all probability, play a much more important part in the fixing of values than was the case last season. Meanwhile, stocks in the U.K. decreased very slightly during July, and they are a good million quarters larger than last year, but are only moderate compared with other years. The world's visible is also moderate, compared with the average of previous years, though larger than in either of the two preceding years. During the next few weeks the markets will probably be almost entirely under the influence of the weather, as is usual at this time of the year.”

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
August 4	Steady ..	3/8	3/10 to 3/10½	3/9 to 3/9½
5	4/7½ afloat ..	Do.	3/10½ ex store	Do.
6	4/8½ off coast; May, 4/9 sailer	Do.	3/10½ ..	3/10½
8	—	3/9 to 3/10	3/11 to 4/-	Do.
9	4/9½ off coast ..	Do.	4/- ex store	3/10½
10	4/9 off coast ..	Do.	Do.	Do.
11	4/10½ afloat ..	3/10 to 3/10½	4/1½ ..	3/10½ (b); 3/11½ to 4/- (s)
12	4/9½ off coast; 4/9½ afloat	3/10 to 4/-	4/0½ ..	3/11½ to 4/- (b)
13	Aug., 4/10½, steamer	3/11 to 4/-	4/1 ..	Do.
15	..	3/11½ to 4/-	4/1 to 4/1½	4/1 to 4/1½
16	Quiet ..	3/10 to 3/11	4/- to 4/1	4/0½ (s)
17	Steady ..	3/10 to 3/10½	4/- to 4/0½	3/10½ (b)
18	Feb., 4/10 ..	3/10 ..	3/11½ to 4/-	3/10 to 3/10½
19	Quiet ..	3/9 to 3/10½	4/- to 4/0½	3/11
20	Firm and quiet	3/9 to 3/10	Do.	—
22	—	Do.	4/-	3/9½ to 3/10
23	Dull ..	3/8 to 3/9	3/11 ..	3/9 to 3/10
24	4/9 off coast ..	Do.	3/10½ ..	Do.
25	Steady ..	Do.	3/10 to 3/10½	3/11
26	Steady ..	Do.	3/10½ to 3/11 ex store	3/10 to 3/10½ (parcels)
27	Firm; quiet ..	Do.	3/11½ ..	—
29	—	Do.	4/-	3/10 to 3/11 (b); 4/- (s)
30	Steady; quiet	3/8½ to 3/10	4/- to 4/0½	3/10½ (b)
31	July, 4/10½, sailer	3/9 to 3/10	4/0½ ..	3/11 to 3/11½
1	Aug., 4/10½, sailer	3/9½ to 3/10½	—	3/10½ to 3/11
2	Aug., 4/10½, sailer; Liverpool, Sept., 4/11½ steamer	3/9½ to 3/11	4/0½ ex store	Do.
3	4/10½ afloat ..	3/10 to 4/-	—	—
4	—	3/11 to 4/-	4/0½ to 4/1 ex store	3/10 to 3/10½; 4/- (par.)

STEAMER FREIGHTS.—In the early part of August steamers were chartered at rates ranging from 24/- to 25/- per ton (7½d. to 8d. per bush.) South Australia to United Kingdom-Continent. Towards the end of the month, however, rates eased off to 23/- per ton (7½d. per bush.). For parcels South Australia to London or Liverpool 22/6 per ton (7½d. per bush.) is obtainable. Port Adelaide to Melbourne, 8/- a ton (2½d. per bush.); to Sydney, 10/6 per ton (3½d. per bush.).

SAILER FREIGHTS.—Some business was done in the early part of the month at 24/- (7½d. per bush.), but rates have now weakened to 22/6 to 23/- per ton (7½d. to 7½d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for August, 1910, at the undermentioned stations, also the average total rainfall for the first eight months in the year, and the total for the eight months of 1910 and 1909 respectively :—

Station.	For Aug., 1910.	A'v'ge. to end Aug.	To end Aug., 1910.	To end Aug., 1909.	Station.	For Aug., 1910.	A'v'ge. to end Aug.	To end Aug., 1910.	To end Aug., 1909.
Adelaide	1.71	15.01	17.45	20.13	Hamley Bridge	1.16	11.58	14.31	15.58
Hawker	1.36	8.25	13.15	12.26	Kapunda	1.48	13.83	16.09	19.79
Craddock	1.53	7.31	11.48	10.38	Freeling	1.92	12.52	15.50	16.52
Wilson	1.72	8.00	14.33	10.92	Stockwell ...	1.04	14.23	14.93	17.95
Gordon	1.93	5.97	8.43	10.27	Nuriootpa ...	2.46	14.90	17.82	20.70
Quorn	2.40	9.54	13.83	12.92	Angaston ...	2.09	15.25	19.21	21.52
Port Augusta.	1.96	6.23	12.87	10.23	Tanunda ...	2.27	15.64	18.88	22.29
Port Germein	1.79	8.50	14.35	12.50	Lyndoch	2.30	16.34	18.07	20.63
Port Pirie ...	1.36	8.87	17.79	10.92	Mallala	1.23	11.87	14.29	15.48
Crystal Brook	1.19	10.46	14.75	15.05	Roseworthy .	1.48	12.25	15.71	16.67
Pt. Broughton	1.07	9.96	13.84	13.13	Gawler	2.06	13.68	16.84	19.50
Bute	2.01	10.91	17.90	13.39	Smithfield ...	1.76	11.76	16.83	16.40
Hammond ..	3.52	7.37	13.80	11.97	Two Wells ...	1.71	12.16	14.27	14.13
Bruce	3.02	6.14	13.59	9.29	Virginia	1.42	12.65	16.50	17.00
Wilmingon ...	3.21	12.36	19.35	17.47	Salisbury	1.25	13.36	17.72	17.41
Melrose	3.12	16.11	24.90	25.00	Teatree Gully	2.72	20.16	22.01	29.05
Booleroo Cntr	2.99	10.76	16.25	14.89	Magill	2.40	18.62	18.81	27.78
Wirrbarra ...	3.45	13.00	20.02	20.39	Mitcham ...	2.09	19.72	18.22	23.37
Appila	2.91	9.94	19.12	13.73	Crafers	5.62	34.03	38.47	51.38
Laura	2.13	11.99	19.92	20.01	Clarendon ...	3.72	24.98	23.90	32.85
Caltowie	2.46	11.34	15.54	14.82	Morphett Vale	2.18	17.15	17.93	22.71
Jamestown ...	3.06	11.38	16.64	15.91	Noarlunga ...	2.24	14.84	16.93	21.20
Gladstone ...	1.44	10.53	12.72	13.18	Willunga	3.44	19.06	22.75	27.07
Georgetown ...	2.08	12.56	15.52	14.85	Aldinga	2.35	14.97	18.10	21.54
Narridy	1.19	11.63	13.77	13.05	Normanville .	2.17	15.32	20.08	19.28
Redhill	1.50	11.57	19.04	16.19	Yankalilla ...	2.63	16.62	27.08	20.00
Koolunga ...	1.31	10.92	17.77	15.08	Eudunda	1.66	11.74	22.59	12.93
Carrieton ...	2.72	8.12	16.08	12.50	Sutherlands .	1.23	—	12.06	9.69
Eurelia	2.78	8.83	15.14	11.88	Truro	1.37	13.58	18.24	19.65
Johnsburg ...	2.03	6.49	12.23	9.95	Palmer	1.74	—	15.09	13.34
Orroroo	3.19	9.34	14.53	12.28	Mt. Pleasant.	3.61	19.44	21.96	24.29
Black Rock ...	3.37	8.13	15.19	12.59	Blumberg ...	3.51	21.74	22.89	26.90
Petersburg ...	2.83	8.55	13.16	11.38	Gumeracha ...	3.95	24.05	25.80	35.19
Yongala	3.04	9.11	13.33	12.05	Lobethal	3.74	26.23	26.37	35.92
Terowie	2.84	8.86	16.06	11.27	Woodside ...	3.81	22.67	27.07	33.36
Yaracowie ...	3.78	9.11	16.85	12.78	Hahndorf	3.85	25.58	39.01	33.04
Hallett	2.80	11.08	13.92	12.14	Nairne	2.92	20.63	25.07	29.30
Mount Bryan	1.43	10.77	14.65	12.36	Mt. Barker ...	3.02	22.32	24.74	29.85
Burra	1.65	12.25	17.18	15.50	Echunga	3.85	23.54	28.51	35.91
Snowtown ...	1.22	11.07	15.31	15.09	Macclesfield .	3.70	21.70	27.69	31.74
Brinkworth ...	1.39	10.17	16.36	13.63	Meadows	4.85	25.51	32.09	35.53
Blyth	1.57	11.31	14.42	16.97	Strathalbyn .	3.14	13.57	19.50	21.59
Clare	1.66	17.11	22.09	23.31	Callington ...	1.40	11.21	13.70	14.98
Min'aro Cntrl.	1.51	15.37	10.34	21.25	Langh'rne's B	1.44	10.66	18.76	12.75
Watervale ...	2.07	19.38	20.84	26.20	Milang .....	.99	12.14	10.70	14.44
Auburn	2.15	16.94	22.67	28.07	Walleroo	1.06	10.07	13.75	14.51
Manoora	1.15	12.45	15.04	16.64	Kadina	1.22	11.63	13.73	16.09
Hoyleton	1.29	12.93	12.89	16.09	Moonta .....	.98	11.16	11.50	16.20
Balaklava ...	1.09	11.21	14.19	14.10	Green's Plns.	1.49	11.48	13.73	16.29
Pt. Wakefield	1.00	9.50	11.65	11.19	Maitland	1.93	14.82	15.18	20.16
Saddleworth	1.32	14.08	16.07	16.83	Ardrossan ...	1.39	10.09	11.41	13.32
Marrabel ...	1.65	12.32	15.95	20.58	Port Victoria	1.76	11.17	12.53	13.80
Riverton	1.51	14.40	19.60	20.17	Curramulka .	2.59	13.81	15.72	17.05
Tarlee	1.13	12.16	15.29	16.68	Minlaton	2.07	13.09	15.14	15.29
Starkeport ...	.85	11.22	11.58	14.39	Stansbury ...	1.81	12.42	15.21	16.20

RAINFALL TABLE--continued.

Station.	For Aug., 1910.	Av'ge. to end Aug.	To end Aug., 1910.	To end Aug., 1909.	Station.	For Aug., 1910.	Av'ge. to end Aug.	To end Aug., 1910.	To end Aug., 1909.
Warooka....	2.15	13.34	16.41	14.07	Bordertown .	1.18	13.47	13.30	16.22
Yorketown .	2.12	12.98	15.82	14.12	Wolseley ...	1.47	11.85	14.45	17.19
Edithburgh..	1.80	12.19	16.47	13.25	Frances....	2.36	13.61	16.11	16.76
Fowler's Bay.	.50	9.60	7.85	10.10	Naracoorte .	1.85	15.56	17.40	19.80
Streaky Bay.	.81	11.86	12.68	15.27	Lucindale ...	1.76	16.57	20.37	11.73
Port Elliot..	1.09	12.66	14.42	15.58	Penola	2.31	18.71	22.21	13.12
Port Lincoln.	2.92	15.16	17.79	15.43	Millicent	4.04	21.43	26.50	30.05
Cowell .....	.48	8.31	9.30	7.72	Mt. Gambier.	4.71	22.44	29.74	31.52
Quesensliffe .	2.73	14.00	28.45	15.79	Wellington ..	.82	10.37	13.01	15.28
Port Elliot ..	2.60	14.95	16.89	14.70	Murray Bridge	.89	9.76	15.97	15.56
Goolwa	2.52	12.77	17.07	18.85	Mannum ....	.89	8.18	13.39	11.26
Meningie....	1.92	13.66	14.51	18.43	Morgan .....	.91	5.83	8.66	6.72
Kington.....	2.25	18.33	19.83	24.29	Overland Crnr	1.99	7.27	12.48	7.45
Robe	2.91	18.81	22.87	24.22	Renmark	1.43	6.72	10.33	8.43
Beachport...	3.06	20.84	26.67	30.48	Lameroo ...	1.33	—	12.32	13.94
Coonalpyn ..	1.25	12.30	11.39	17.77					

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. Sandford & Co. report the following quotations on September 1st:—

FLOUR.—City brands, £9 10s.; country, £9 5s. per ton of 2,000lbs.

BEAN.—11½d. to 1s. per bushel of 20lbs.

POLLARD.—11½d. to 1s. per bushel of 20lbs.

OATS.—Local Algerians, 1s. 10d. to 1s. 11d. per bushel of 40lbs.

BARLEY.—Cape, seed, 2s. 3d. to 2s. 6d. per bushel of 50lbs.

CHAFF.—£3 5s. f.o.b. Port Adelaide, per ton of 2,240lbs.

POTATOES.—Gambiers, £5 5s. on trucks Adelaide or Port, per ton of 2,240lbs.

ONIONS.—Gambiers, £5 5s. to £5 10s. on trucks Adelaide or Port, per ton of 2,240lbs.

BUTTER.—Best factory and creamery, fresh in prints, 10d. to 11d.; second grade factories, 9d. to 9½d.; choice separators, dairies, 8½d. to 10d.; fair quality lots, 8d.; stores and collectors, 7½d. to 8d.

CHEESE.—Factory makes, new season's, 5d. to 5½d.; aged lots 5d. per lb.

BACON.—Factory cured sides, 7d. to 8d.; middles, 8½d.; well cut and cured farm fitches and rolls, 5½d. to 6½d. per lb.

HAMS.—9d. to 9½d. per lb.

EGGS.—8d. per dozen for prime guaranteed new-laid hen.

LARD.—Skins, 5½d.; bulk, 5d. per lb.

HONEY.—Prime clear extracted, 2½d.; second grades, 1½d. to 2d.; beeswax, 1s. 1½d. per lb.

ALMONDS.—(Scarce) Soft shells, Brandis, 7d.; mixed soft shells, 6½d.; kernels, 1s. 3½d.

LIVE POULTRY.—Good table roosters, 2s. 9d. to 3s. 3d. each; plump cockerels, 2s. to 2s. 6d.; hens and light cockerels, 1s. 8d. to 1s. 10d.; ducks, 2s. 6d. to 3s. 6d.; geese, 3s. 6d. to 4s. 6d.; pigeons, 7½d.; turkeys, 8d. to 10d. per lb., live weight, for fair to good table sorts.

AGRICULTURAL BUREAU REPORTS.

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Butler	†	—	—	Mount Gambier	206	10	—
Caltowie	171	17	15	Mount Pleasant	204	9	14
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Cradoek	167	17	—	Orroroo	—	—	—
Crystal Brook	—	—	—	Parrakie	197	3	1
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Lyndoch	†	15	13	Yallunda	†	—	—
Maitland	187	3	1	Yallunda	†	—	—
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REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, August 16.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. O'Donoghue (chair), Griffen, Gum, Ward, Wallace, Brown, Bristow, Gum, Cormack, Crisp, Stokes, and Thomas (Hon. Sec.).

TREATMENT OF SOIL.—Mr. Brown read a paper to the following effect:—"The greatly increased yields of more recent years, especially in parts where wheats could hardly be grown at all previously, were partly due to fertilisers and better cultivation. The importance of the latter should not be underestimated. To be successful in this district fallowing should commence as soon as possible after seeding. The depth of ploughing had to be governed by the nature of the soil. Sometimes patches would be met with in which the red clay subsoil was within an inch of the surface, and this, in his opinion, it would be a mistake to disturb. Again, to plough deeply a patch which was devoid of vegetation on account of the presence of an excess of magnesia was only courting failure. The man on the plough should raise or lower the lever as he deemed fit when dealing with variable land like this. As a general rule, however, 4 in. was deep enough for the district. After fallowing, the land should be worked straight away to kill weeds and make a moisture-saving surface mulch. For this he would use a disc cultivator with all the discs turned the same way, and work the soil at right angles to the ploughing. Weather being suitable he would then harrow, and fairly clean fallow would result. Harrowing would again be necessary before drilling. Owing to the uncertain rainfall, 40 lbs. of super. per acre was the safest dressing. Land worked in this way should give a good return. It was better to put 200 acres of well-worked soil under crop than 300 acres slovenly treated. If lack of time or horse strength made it impossible to fallow as much land as it was desired to crop it was a good plan to put sheep in a paddock to keep all weeds eaten down. If this were ploughed and harrowed between harvest and seeding time, and then sown, a good return should follow." In the discussion which followed, Mr. Gum did not think moisture could be retained in the soil through summer for the next year's crop. All the other members were certain that a large percentage of the winter and summer rains could be stored in the soil by judicious working. The fact that various weeds grew during the hot and often dry summer on the land lying fallow, keeping green when plants and weeds elsewhere were quite dry, proved this. Mr. Gum had noticed where roads had been cut through the crop for hay and ploughed soon after a much better yield resulted in the succeeding crop than in the rest of the paddock that was ploughed three or four months later. The Hon. Secretary thought there were three contributing causes. First, more of the moisture already in the soil would be retained by the early ploughing; second, the ploughed land would absorb and retain more of the water from the summer rains than would be absorbed by the stubble land; third, when stubble was ploughed in in this district the rains were insufficient to rot it; it caused the soil to lie in an open state and let the hot dry northerly winds get at the roots of the plant, while on the ploughed hay ground the soil lay closer and the crop would be much better.

MARKETING LAMBS.—A paper was read by Mr. Ward on this subject. He had sold lambs and sheep on the farm, in the market, and had exported them. As the result he had no hesitation in saying that the last method of disposing of lambs paid provided a man was prepared to take a little risk. There was risk of loss from rejects. These were always sold at a loss, and the freight and slaughtering fees, making a total of 6d. per head, of course had to be paid. The fluctuation of the London market between freezing and selling all had to be considered, and the fact that the seller did not know what his lambs would bring and did not receive full value for a considerable time after shipping were unsatisfactory points. But there was money in it as was shown by the vast business carried on. He advised intending exporters to weigh all lambs before

sending them, as only an expert could judge the weight correctly. Very often a big lamb would fail to reach the standard of live weight, while a smaller though plumper one would do it easily. The paper was well discussed. The majority of members preferred to sell locally to exporting, as the results of exporting often did not justify the risks incurred. At times when the fluctuations of the market were in the favor of the seller, however, an extra profit might be gained.

Arden Vale and Wyacca, July 25.

PRESENT.—Messrs. Eckert (chair), O. and P. Hannemann, Greer, Hantschke, Schumann, Pearce, jun., C. Pearce (Hon. Sec.), and four visitors.

WHEAT AT THE MARCH SHOW.—Members were of opinion that the wheat exhibit at the Show was not at all creditable to the farmers of this State, particularly those who had facilities in the matter of railway and wheat-graders. In the former respect this Branch was at a disadvantage, but members were willing to compete if free rail carriage for the exhibits could be arranged to the city.

ANNUAL MEETING.—The Hon. Secretary reported that six meetings had been held, with an average attendance of 10 members. The following subjects had been dealt with:—"Dairying," "Co-operation," "Settlement of Irrigation Lands," "Rabbit and Wild Dog Pest," "Wheat Experiments," "Manures for Wheat," "Implements," "Tree-planting," and "Diseases of Wheat."

Arden Vale and Wyacca, August 22.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. M. Eckert (chair), A. Eckert, E. and W. Klingberg, O. and P. Hannemann, Willis, Fricker, Pearce, jun., C. F. Pearce (Hon. Sec.), and several visitors.

GRADER FOR BRANCH.—It was decided to purchase a grader on the co-operative principle so that all members could grade their seed wheat.

WEEDS ON FALLOW.—Discussion took place concerning the best way to kill weeds on fallow. The past good seasons had caused an enormous growth of weeds. Members were unanimous in the opinion that for the local hilly country the skim plough was the best implement.

ARBOR DAY.—Arbor day was observed in Wyacca recently and this Branch rendered assistance. The Hon. Secretary, with the aid of his sons, ploughed the land and sunk the holes for the trees. They also gave the best instruction and advice in their power to the children regarding the care and treatment of trees. There were now 132 trees in the schoolgrounds, including sugar gums, pepper, and almond trees, and 45 native red gums. These were not so handsome as the sugar gums, but hardier, better withstanding drought and frost and less susceptible to the attack of white ants. The red gum timber was also of greater value locally for fencing.

BORING PLANT.—Members wished for information regarding the hire of boring plant from the Government. [Hand-boring equipment for sinking to a depth of 200ft. can be hired from the Engineer-in-Chief, Adelaide, for a few pounds. If tools for boring rock are required they may also be secured. For full particulars write to the address given above.—Ed.]

Carrieton, July 28.

(Average annual rainfall, 11½in.)

PRESENT.—Messrs. Gleeson (chair), Beerworth, Williams, Earl, Fisher, Vater, and Bock (Hon. Sec.).

FARMING IN DRY DISTRICTS.—The Hon. Secretary read a paper on "Farming in Districts Outside the Goyder's Line of Rainfall." There was a great difference, he said, in dairying or wheat-growing inside and outside this line. Nevertheless, a good manager could make a good living in the dry districts of the North. With a farm of, say, not more than 1,500 acres dairying could be profitably carried on in conjunction with wheat-growing. A man should, if possible, rear his own cows and get a strain well suited to the conditions of the district. For rough, hilly country, they must be able to stand the stony land without becoming "tenderfooted." If on land of a sandy or loamy nature, such as that of the plains, a heavier type could be kept, which would realise a good price for beef when culled out of the milking herd. In his experience home-bred cattle gave

better results than those purchased from a distance. In a fair season when there was good feed in the paddocks (he never hand-fed his cows), the return should be at the lowest £8 per cow per annum. In addition to this must be added 20s. to 25s. for the calf. Considerable labor was involved in the dairying industry, but it paid. It was best to use a separator and send the cream to the factory. This paid better than making butter, especially in the hot months, when it was practically impossible for a farmer to keep butter in good condition after the labor of making it. Given the proper methods, wheat-growing could be carried on profitably in the dry districts. Probably dry-farming methods would still further improve the yields. He would fallow to a medium depth with a good plough, which cut a furrow 9in. wide or less. Cultivating should be done to about half the depth of the ploughing, and this and harrowing should be done sufficiently often to keep the surface soil loose. It was undesirable to crop the same land more often than once in three years. Drilled-in wheat was even in growth, and did not easily go down with strong winds. Early varieties yielded best in most cases, as they were well advanced when the dry weather set in. Mr. Fisher agreed that on 1,500 acres dairying and wheat-growing could be carried on together profitably. It was wise to have more than one source of income in this way. On larger holdings of 2,000 acres and upwards sheep should be kept. They were profitable and helped to keep the land free from weeds. The Chairman indorsed Mr. Fisher's remarks, but added that if dry-farming methods proved successful in these parts wheat-growing would undoubtedly come to the fore again.

Coomooroo, August 22.

(Average annual rainfall 12in.)

PRESENT.—Messrs. Berryman (chair), Brown, Brice, Avery, Robertson, Kildea (Hon. Sec.), and two visitors.

SHEEP FOR THE FARM.—The following paper was read by Mr. Avery:—"I think sheep should be kept on every farm, and that, if properly managed, there is a good deal to be made out of them, as they are profitable in more ways than one. Of course it is necessary to have a farm sheep-proof, which means a considerable outlay, but it will be money well spent. Another point of importance is a permanent water supply. This applies to a certain extent in keeping stock of any kind, but more especially with sheep, as they will not stand much driving to water. I think a farm of 1,000 acres should, in this locality, besides other stock be able to carry at least 150 breeding ewes, which should be good-sized Merinos. For a number of years lamb-breeding for export has been a good paying business, and for this purpose I would recommend the Shropshire cross in preference to the pure Merino. They mature earlier and give more weight at a given age. They also seem very hardy, and will keep in good condition on poor feed better than the pure Merino. I would put the rams with the ewes about the end of October, and leave them together for about a month or six weeks. I should say for 150 ewes three rams would be necessary. From such a flock one might easily expect to rear 130 lambs, and they at shearing time should be worth at least 10s. apiece, or £65 for the lot. The ewes should cut 9lbs. of wool worth 8d. per pound, which makes 6s. per head; in all, £45 worth of wool. Apart from these profits directly derived sheep, by eating rubbish off fallow and not allowing it to seed, save work and often make a cleaner job than the cultivator." In the discussion which followed, Mr. Brown thought it would be wise to put one Merino ram in a flock such as that suggested in the paper in order to get a few hardier lambs. He preferred to put cattle to eat out weeds, as they took the heads of wild oats when in ear, which were left by sheep. Mr. Kirkland pointed out that Merino rams being horned generally fought the Shropshire if put in the flock together. Mr. Brice would put four rams with 150 sheep to get a better percentage of lambs. Some sheep to keep down weeds were a necessity on every farm, but a good water supply was needed. Mr. Berryman considered a few good wethers for fattening gave a quick return, and were a safer investment than lamb-breeding. Where breeding was carried on he advised members not to breed from younger than 6-tooth rams and ewes. Early lambs were best to get a good percentage. Later in the year ewes lost their lambs when coming from water.

FALLOWING.—Considerable discussion on this subject took place. Mr. Brice would get to work as soon after seeding as possible, before the weeds got too forward; ploughing fairly deeply in order that there should be enough soil to hold the moisture. It should be turned down properly. Rooting up the ground was only time wasted so far as cleaning went. He next would harrow so that the sheep would not make tracks along the furrows. It was generally a good plan to have the wing of the share slightly raised to save it from

being broken. This relieved the jar on the share when it met with any obstacles. The share should be packed to fit firmly, or else the sockets would be broken. Members agreed that early fallow well cleaned and cultivated was the best. Scarifying stubble after harvest and ploughing it in winter made good fallow.

Cradock, July 23.

(Average annual rainfall, 10 1/2 in.)

PRESENT.—Messrs. M. J. McAuley (chair), Patterson, Graham, Neylon, Lindo, Gillick, Finch, Sullivan, Glasson, Riordan, Solly, Hilder, and J. J. McAuley (Hon. Sec.)

WOOL VERSUS CARCASS.—The following paper was read and discussed:—"A great number of people in the North of late years have been paying far too much attention to the development of sheep with a large carcass. By attaining their object in that direction they find, when shearing-time comes, the clip has suffered as a consequence. This, of course, is only natural, for if we aim at the production of flesh we must patronise the English breeds, such as Shropshire, Romney Marsh, Dorset Horn, &c., which will not produce as good a wool as the Merino. If we were sure of being able to fatten these early maturing varieties, and of the present prices ruling for lambs, we could not do better than breed them; but with the uncertainty of favorable seasons in the North we shall be taking a safer stand if we breed a large-framed, robust, strong-woolled Merino. Then we shall have a type of sheep of sound constitution, able to battle with unfavorable seasons, which will always give a profitable return from wool, and which, under normal conditions, will demand good prices in the mutton markets when fat."

Davenport, August 16.

(Average annual rainfall, 9 in.)

PRESENT.—Messrs. Roberts (chair), Hobby, Bice, Messenger, Gosden, Sanderson, Nestor, and Lecky (Hon. Sec.).

SAND DRIFTS.—Mr. Nestor read a paper on "The Reclamation of Sand Drifts," as follows:—"In various parts of the district there are extensive patches of sand drifts, which in one night may be moved from one locality to another with disastrous effects. At Stirling North the drifting sand has been a source of ruin, and many of the residents have had to abandon their homes. No doubt the past droughts have been the cause. The question of combating the trouble has engaged the attention of the land-occupiers. From practical experience I am of opinion that the best method of dealing with this evil, providing we have favorable seasons, is to sow with wheat or other seed. I find barley grass suitable also, but, recommend wheat, as the return from the yield would pay for the extra work. Immediately the wheat is sown it should be covered with straw. If left for a few days the wind blows a fine surface on the sand, and therefore the straw will not bind so well. If it is applied on a smooth surface when a strong wind is blowing it will be blown up in small heaps. Therefore choose a calm day for this class of work. Two inches of straw is a sufficient thickness; this is the quantity used last year, and the result was magnificent. I have made other trials with manure from the stables, but find that more costly, and it takes a larger quantity than straw to cover the same area. This year I tried another scheme, sowing late in the season, but the experiment proved a failure. Unless these sandhills are resown they will continually drift. It is useless to sow with wheat unless covered in the manner mentioned. The sandhills dealt with last year are this season looking splendid and green, having barley grass 8 in. in height on them. In any event the whole question of sand drift will be more easily settled if dealt with at its early stages than if left until the problem becomes a pressing one." In the discussion which followed reference was made to the various methods adopted by local governing bodies and private individuals. The question was asked whether seaweed would do as well as straw, or whether it was too salt. Mr. Hobby was of opinion that it was not injurious, and would answer as well as straw. All those present were of opinion that the methods outlined would be effective provided that stock were kept off the drift.

Hawker, August 22.

(Average annual rainfall, 11½in.)

PRESENT.—Messrs. Rhymer (chair), Hirsch, Palin, Pyman, Pampa, Smith (Hon. Sec.), and one visitor.

FALLOWING.—Mr. Pyman read a paper on "Fallowing," a work which, he said, should be commenced as soon as possible after seeding. The land was then opened in time to get full benefit of the winter rains. Stubble should first be cultivated, if possible, with a disc cultivator in the autumn. This would prepare it for ploughing, encourage the weeds to grow, and result in cleaner fallow later on. The depth of ploughing had to be governed by the nature of the soil and the season. Most of the local plain country, however, gave good results with a 4-in. ploughing. He was strongly of opinion that it would pay to experiment in regard to this and other questions. The farmer who experimented always found out something which amply repaid him in the long run. After ploughing for fallow the land should be run over with sharp harrows, and then worked with harrows or disc cultivator after every rain which was sufficiently heavy to cause the surface to settle. This working, however, should only be done when the soil was moist, as if worked when dry it became pulverised too finely and ran together with the first rain, resulting in more harm than good. He would strongly recommend farmers to cultivate the land much more than in the past. The days when simply ploughing, seeding, and harrowing constituted the whole of the cultivation of the soil had gone by, and the good returns of late years in the older districts of the State were largely due to improved and more thorough cultivation, and not solely due to the use of fertilisers. Every farmer could have an experimental crop, and by means of it he would enrich himself, his neighbor, and ultimately the whole State.

Hookina, August 20.

PRESENT.—Messrs. Stone (chair), Carr, Kelly, Henschke, T. Henschke, P. and B. Murphy, Conner, and Madigan (Hon. Sec.).

RAISINS AND CURRANTS.—Mr. Henschke tabled some raisins and currants which he had grown and dried. He was not an expert, but dried these muscatel grapes and Zante currants as an experiment. Samples were forwarded to the Department of Agriculture. [The currants were of exceptionally high quality, and the raisins were also a very good sample of Lexias. This work will be watched with very great interest.—Ed.]

BUDDING.—Mr. Henschke wished to know the best time to bud apricots and peaches. [The operation of budding may be performed any time when the sap is flowing freely in stock and scion. Probably during the early part of summer will be best in this district, unless plant can be watered to ensure the sap moving freely later on.]

Quorn, August 20.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. Thompson (chair), Noll, Twopenny, Finley, Brewster, McColl, and Patten (Hon. Sec.).

ENSILAGE.—Considerable discussion took place following on the reading from the New South Wales *Agricultural Gazette* of an article upon ensilage. Mr. Twopenny was of opinion that farmers in the dry North would have better results from hay. Mr. Noll said that there was a lot of waste with ensilage [Not necessarily so.—Ed.], but cows seemed to do well on it. Mr. Brewster thought a given crop turned into ensilage would give a greater weight of fodder than if made into hay. [Experiments at Roseworthy College Farm have shown in three consecutive years that over two-thirds of the weight of fodder is lost in drying for hay. For example, a crop which would yield seven and a half tons of ensilage per acre would give about two and a half tons of hay.—Ed.]

Wilmington, August 18.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Payne (chair), Hill, Slee, D. S. and S. George, Litchfield, Jacobs, Noll, Farrell, Schuppan, Hannagan, Hoskins, Zimmerman, and Jericho (Hon. Sec.).

WHEAT EXHIBITS AT MARCH SHOW.—Members were of opinion that graded wheat was not a fair average sample, and also that the quantity fixed was too large, resulting

in heavy expense to the exhibitor. At the same time they unanimously agreed that exhibitions of wheat should be strongly encouraged.

BUREAU WORK AND EFFICIENCY.—The Chairman read a paper on this subject. Having stated that the Branch, although of great value to the district, had not yet realised its possibilities to the full, the paper continued to the following effect:—"The strictly scientific aspect of farming is not immediately within the reach of ordinary men of the soil, but nevertheless accurate and scientific information is supplied month by month in the *Journals* which are mailed free to all members. It behoves every live member not only to peruse this extremely valuable journal of concreted scientific information, but to so study the outline and important points as to be reasonably familiar with the case as set out. It is quite possible for a farmer to continue year by year cultivating, sowing, and reaping after some preconceived plan, and yet at the end of life to be but little further ahead of his occupation and aims than when he first started. This form of conservatism must be broken down, and means adopted and successes achieved by others must be inquired into. Such work, when done alone, demands enthusiasm and persistency not easily developed by the many; but in conjunction with other seekers after information the operation is much more facile than supposed, and the result is more than gratifying and helpful. Knowledge acquired in whole or part by personal effort is much more practical and beneficial than a mere statement of thoughts or facts by others. We meet as a concrete body here to assist each other to discover something we are all in quest of, and then through the medium of the Bureau reports to benefit others. Thus we see set before us the magnificent force of co-operation. Every man can think and give expression to his thoughts in some way or other if he will, and together members can see the practical suggestions and bring to light something perhaps of immense value. Every member of the Bureau has a part to play, and he should play it. Much of the lack of life and vim in our meetings arises from the fact that the great battles of thought have to be fought by the few. The work then up to a certain extent becomes monotonous, and inoperative members lose interest. Is there a remedy for this condition of affairs? Yes; undoubtedly there is. Every member should be active and realise his responsibility through membership. Simple attendance, praiseworthy though it may be, is not sufficient. Each member must take such an active part in the subject at issue as to develop difference of thought, and thus enable the meeting to arrive at the best decisions. Of the great value of our Bureau system, its objects and aims, I need not speak, but whether those objects and aims are as pointedly and consistently before us as they should be is quite another matter."

Wirrabara, July 23.

(Average annual rainfall, 30in.)

PRESENT.—**MESSRS.** H. E. Woodlands (chair), Curnow, Borgas, Bowman, Blessing, A. Woodlands, Pitman, W. H. and E. J. Stevens, Hollett, Passow, Kendrick, G. Hollett, Hoskins, P. and H. Lawson (Hon. Sec.), and two visitors.

CARE OF VEHICLES AND HARNESS.—A paper on this subject was read by Mr. Kendrick. There were many untidy farmers, he said, who seemed to forget that large sums of money were required to properly furnish a farm with vehicles and harness; consequently these necessities were neglected in a shameful manner. Every class of vehicle, from the best buggy to the wheel-barrow, should be housed when not in use. A great deal of work could be done in a vehicle-shed on wet days, such as putting in new bolts, tightening up nuts, and painting. In summer time wagon wheels were frequently heard creaking for want of attention, and more often than not they were allowed to run off before being taken to the blacksmith. On a wet day a farmer might well make a few wedges to be carried in the wagon in case the tires should give trouble in hot weather. Paint was a great wood-preserved, and if the brush was used on the wheels of the heavy vehicles during the off-season, the life of the vehicles would be much prolonged. Fowls should never be allowed to roost on vehicles. They made everything filthy, and ruined the varnish. It was a good plan to carry in the wagon box for reference a piece of cardboard on which the dates of greasing the axles, &c., were recorded. Harness should be hung on suitable pegs. Trees were often broken by throwing saddles in a corner. A sore back for the horse was the result, and needless expense for repairs was incurred. Rivets, awl, needles, and wax-end should be always handy, and minor repairs made as needed. After repairing harness should be taken to pieces and thoroughly scrubbed with warm water and soap, and then well dressed with neatfoot oil. Sore shoulders could often be avoided by keeping the lining of the collar clean, and if the initial letter of each horse's name was burned on the collar each animal would work in its own, and

the likelihood of sore shoulders be still further reduced. Attention to the details outlined would result in a tidy farm and an increased banking account. Several members spoke on the subject, and agreed with the main points of the paper. Mr. P. Lawson had made it a practice to oil harness twice a year for the past 40 years. In reply to a question he said he had found linseed oil the best for wheels, put on as hot as possible. Mr. Pitman also treated wheels with hot linseed oil, and applied it with a rag on a stick. Mr. Blesing had found a mixture of neatsfoot oil and mutton fat the best preservative for harness.

Wirrabara, August 20.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. H. Woodlands (chair), Stevens, Blesing, Pitman, E., G., and C. Hollett, A. Woodlands, Dorgas, Lawson, Hendrick, Bowman, Hoskins, H. Lawson (Hon. Sec.), and two visitors.

PIGS.—Mr. E. Hollett read a paper on "Breeding, Rearing, and Keeping Pigs." Pigs were decidedly the best stock for the poor man, as they multiplied rapidly, and quickly came to maturity. A good brood sow with proper treatment would farrow two litters of eight or nine each in a year, and these could be ready for market from six weeks old. He considered they paid well at 8s. per head when ready for weaning. Milk, kitchen slops, and farm offal made splendid food for pigs. It would pay better for a farmer who had not sufficient land to keep young cattle in good condition to kill the calves and give the milk to the young pigs. At six months a young pig should be worth 25s., and a calf would seldom bring that price at that age. The milk required for one calf would, with offal, be enough to raise several pigs. Another advantage with pigs was that they could be marketed at any time when the owner was in need of ready cash. Mr. P. Lawson agreed that pigs paid well provided the right breed was procured and not too many were kept.

LUCERNE-GROWING.—A short paper on this subject was read by Mr. Pitman. He had purchased some seed said to be Hunter River in May last. The germination was very poor, and the crop not true to name. He wrote to Mr. McIntosh (Superintendent of Reclamation and Irrigation), and learned that South Australian was the best seed at present on the market. Super. might be sown with the seed provided there was sufficient moisture or rain fell to cause it to germinate at once. Mr. Pitman strongly advised intending planters to thoroughly clean the seed and remove all dodder, &c. Too many weeds had been imported in seed in this way. Finally he spoke very highly of the article in the August *Journal* written upon this subject by Mr. McIntosh.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, August 15.

PRESENT.—Messrs. Burton (chair), Ryan, W. and S. Petrie, Jacobie, Murphy, Woolford, Curtin, Thyer, C. and S. Cox, A. and F. Bartrum (Hon. Sec.), and one visitor.

CITRUS FRUITS.—The Chairman read a paper on "The Cultivation of Citrus Fruits," of which a *resume* is given. This district was eminently suited to the production of citrus fruits, both in climate and soil. Citrus fruits were less liable to injury than many others on account of the thickness of the skin, and, given proper cultivation and treatment, should prove very profitable. Water was needed in dry months. The roots should be disturbed as little as possible, and weeds and undergrowth should be kept down. The sandy flats along the creek, with a porous subsoil and limestone soil of a good depth, suited oranges very well. The soil should be broken up well, and if lacking lime, potash, or other plant food, these of course must be supplied. The most favorable time to plant was April, but in August and September the trees might be successfully started. The warm state of the ground in autumn, however, gave them the best start. The roots should be spread out in all directions, and the trees should not be set too deeply. He

would plant with 22ft. space each way, although the mandarins could be rather closer than this. Certain crops might be grown between the trees when they were quite young, provided care was exercised not to interfere with the citrus trees. A mulch of stable manure should be put on the surface, and fresh supplies added from time to time; the main dressing to be given in October, so that the roots would be protected in the hot months. Rank shoots, dead or diseased wood should be removed, and overcrowding branches corrected to admit light and air. Further than this no pruning was required. It was inadvisable to allow young trees to bear very freely, as this would lessen the growth of wood, and growth in young trees was the principal consideration. In cultivation, roots should not be disturbed to any great extent, and digging or ploughing among them could not be too strongly condemned. A light horse hoe or cultivator was the best implement to keep down the weeds. On the local sandy flats the trees were doing remarkably well, the favorite varieties being Washington Navels, Silletta, St. Michael, Sabina, and Mediterranean Sweet. One of the best mandarins was Beauty of Glen Retreat.

Brinkworth, August 27.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. Brinkworth (chair), Davis, Kreig, Ottens, Hill (Hon. Sec.), and one visitor.

FODDERS.—Mr. Davis initiated a discussion on the provision of fodders. He was strongly of opinion that if more ensilage were fed to cattle there would be less dry bible. Marshmallows and artichokes cut green and tender made very good ensilage, and stock relished the food in the dry months. Farmers did not make the best of the natural fodders which could be turned into ensilage. The labor involved was probably the reason for this. He strongly recommended using wild oats, clovers, lucerne, sorghum etc., for this purpose, sprinkling salt on each layer of green stuff as it was put into the silo. For green feed he favored barley, as it grew quickly and provided a good early cut. Mr. Brinkworth had made good ensilage with artichokes. They were difficult to handle, however, on account of the prickles.

Caltowie, August 13.

(Average annual rainfall, 17 in.)

PRESENT.—Messrs. Hewett (chair), Graham, H and L. Collins, Petatz, G. and F. Williams, S. and C. McCallum, Amey, Wilsdon, Royal, J., G. H., and F. Lehman (Hon. Sec.).

PROS.—The following paper on "Pig-raising" was read by Mr. McCallum:—"For keeping pigs there should be several small paddocks sown with different kinds of fodder, such as barley, lucerne, and peas, letting the pigs have the run of one paddock at a time. With plenty of green feed and clean water pigs will do well until about six weeks before killing, then they should be fed on corn and crushed oats to make good, firm bacon. For breeding choose long, roomy, deep sows, with broad loins and strong backs. They are the sort to carry large litters. The teats should be well apart, and the greater number the better; 12 or 14 is considered very good. Sows should be mated when about eight months old. I prefer the Berkshire boar and the Poland-China sow for bacon and for selling. They always look well, and it takes little to keep them. When selling suckers pick out two or three of the best every two weeks until they are all gone. For the last five or six years it has been more profitable to sell pigs as suckers. When sows are rearing their young give them plenty of slop food, milk and pollard, or plenty of water and pollard if milk is scarce. Milk is decidedly better, however, and the young pigs soon learn to drink it, and do well on it. About a week before farrowing the sow should be put in a sty by herself, and chaff given her for bedding. If straw is given there is always a danger of the young getting under it and being overlain by the mother and smothered. For bacon I prefer pigs of about 180 lbs. Do not feed later than the night before killing. Use a long knife for sticking to make the pig bleed well. The better bled they are the better the bacon is for curing. Do not put the carcass into boiling water, but add a little cold to it first, as this makes the scraping easier and better. For curing, rub with coarse salt and a little saltpetre to bring out the blood. In about two days use the best salt with a little saltpetre and brown sugar. Rub every two days and turn in different positions, and if it is dry weather sprinkle lightly with water."

UN SOUND STALLIONS.—The paper on this subject read at a recent meeting of the Georgetown Branch, see page 1096, July issue, was read and discussed. Members considered it unfair that exhibitors at shows could not learn the reasons for rejection of their animals. [Members must be misinformed as to the conditions. A reference to the regulations printed on page 205, October issue, 1909, will show that the grounds for rejection are properly withheld from everyone else, but that the owner or authorised agent can learn what unsoundness exists in his stallion by making proper application.—Ed.] Mr. Graham thought the licensing of brood mares was as necessary as that of stallions, and he opposed the one without the other. Mr. Hewett had heard that cases had been known where a stallion had been passed by one examiner and rejected by another. The Branch did not favor licensing or taxing of stallions travelling for hire on the grounds that it would raise the service fees, and inferior stallions would be kept by private owners for their own breeding purposes.

DEPTH OF PLOUGHING.—Mr. Graham, in reply to a question, said 5in. was a fair depth to plough in this district. It was generally considered that on account of the variations in soil a uniform depth could not be laid down as a rule. Deep ploughing was favored, however, where the soil would admit of it being done.

Mount Bryan, August 13.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. Dunstan (chair), Kelly, Wardle, Thomas, Schmidt, Edwards, Hatherly, E. K. and A. Collins (Hon. Sec.).

PROTECTION OF HAY.—The Chairman read an interesting paper on "The Protection of Haystacks," to the following effect:—Very large quantities of hay were destroyed annually by rain. Many farmers simply put from 1ft. to 3ft. of straw on the top of a stack, and then let the hay take its chance. As a general rule this kind of protection proved a failure. Thatching, if well done, was satisfactory, but in this district he feared that very few people thatched properly. The disadvantage was, however, that the thatching only served for one stack, and each time the operation had to be repeated a great deal of labor was involved. A good way of covering a stack was to fasten sheets of ruberoid on to wire netting of the same width, making it secure with wire, and roof the stack with this. When not in use it could be rolled up and put away for the next season's hay, and if care was taken it would last a long time. This covering was easily and quickly put on the hay, and immediate protection was assured. In his opinion it would not cost more than raking, carting, and pitching on straw for one season. Constructing a high roof on the top of long poles would also pay for itself in a year or so. He knew a farmer who, when he came to the latter half of his haystack found that 12 tons had been destroyed, and this had cost him £5 per ton. In that case the price of a permanent covering for his hay was lost in one year. The cost of ruberoid and wire netting for a 50-ton stack was about £10; for an iron and wood covering, including all sundries and erecting £43. Members were of opinion that the stacks in this district did not receive sufficient protection from the weather, and they seemed inclined to erect sheds on their own farms for the purpose.

Mount Bryan East, August 20.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. J. Thomas (chair), R. Thomas, J. Doyle, W. Dare, T. Quinn, (Hon. Sec.), and six visitors.

SUNDRY TOPICS.—General discussion took place. Members agreed that the stemless horse thistle should be destroyed. The Chairman reported a case of lockjaw in lambs, which he thought was due to the use of the searing iron. He also described the work of a mud scoop, which was worked with six bullocks—four pulling and two drawing back. It took a ½yd. scoop in fairly heavy mud. Foxes were said to be good rabbiters, and they did not touch the lambs in the district as a rule.

Mundoora, August 19.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Button (chair), Fuller, Carman, Mildren, Aitchison, Stringer, J. H. and W. J. Shearer (Hon. Sec.).

POLL CATTLE.—The following paper on poll cattle was read by Mr. Fuller:—"In the United States the polled Shorthorn is of some years' standing, but a newer variety seems

to be the polled Hereford. In *The Breeders' Gazette* Mr. C. T. Mercer says—"Through an accident I bred a Hereford to a red-polled bull; the offspring was a male, with perfect Hereford markings and polled. Being a good individual I left him entire for about five years, using him on a small herd of horned cows of mixed breeding, Hereford blood predominating. About 40 per cent. of the bull calves polled and about 75 per cent. of the heifer calves polled, some of both sexes having scurs. Selecting a small number of the best polled heifers carrying the most Hereford blood I crossed them with a polled Hereford bull bred a few years earlier from polled Durham blood in place of red polled. The result of this cross was 98 per cent. polled calves from the polled cow and about 60 per cent. from the horned cows. I still selected the best and bred to another bull of the same blood lines. I had produced 100 per cent. polled calves and several of the bull calves of this generation have gone into herds of horned cows where no polled blood existed and sired 100 per cent. polled calves. So anyone can see that they are now as strong breeders as the older polled breeds." Mr. Fuller said he had started breeding last year with a poll bull on the above lines, and the result among the horned cattle was 40 per cent. poll the first year.

Port Germein, August 27.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Carmichael (chair), Crittendon, Deer, Hillam, Holman, Hackett, Turner, Stone, Blesing, Simper, Head, and Stock (Hon. Sec.).

ENSILAGE.—The following paper was read by the chairman:—"In my garden and in various parts near the house there was a large quantity of herbage which the cattle could not reach, so I thought I would utilise this in my experiments. The herbage consisted largely of dandelion and barley grass; it was cut with a scythe and not chaffed. *The Stack*.—Two men were at work on the stack for two and a half days. It was 4yds. square and 10ft. high. It was completed on the 7th of October and opened on February 5th. On opening the stack I found that about 18in. had a dirty, rotten appearance, but the inside was of a good yellow color. I fed this to three cows for three weeks. *Silo Pit*.—My pit was 8ft. x 7ft. and 8ft. high, and took two men three and a half days to complete. The outside edges of the ensilage were spoiled by heavy rains causing water to flow into the pit, but the inside was good. From this pit I fed three cows for five weeks, and during that time no bran or chaff was given to them. I found that the cows gained in condition, their coats improved very much, and the milk was rich and the butter a splendid color. I consider that ensilage-making pays, as it saves bran and chaff. It enables us to use up herbage that would otherwise be wasted. Finally it improves the health of the cows, and would, I am sure, go far to prevent dry bble. I may also mention that my pigs did splendidly on the portions that were discolored and seemed rotten." An interesting discussion followed.

Port Pirie, August 13.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Johns (chair), Greig, Welch, McEwin, Hawkins, Birks, Teague, Hector, Jose, Smith, and Wright (Hon. Sec.).

ENGINES FOR CHAFF-CUTTING, &c.—Mr. Hawkins read a paper on this subject to the following effect:—"No farmer should be without an engine for chaff-cutting, &c. The convenience, saving of horseflesh, time, and labor, will fully justify purchasing an engine. Some argue that the horses may as well be working in the cutter as standing in the stable. But if enough hands are available the horses can be used to more advantage elsewhere. Getting ready to cut with horseworks entails a lot of work in the majority of cases, whereas with an engine nicely housed everything is ready to start in a few minutes. In regard to the cheapest and best engine there is a great difference of opinion. If a farmer goes in for chaff-cutting on a fairly large scale, making chaff one of the saleable products of his farm, and accordingly employs enough labor to run the thing successfully, he will need a 12 to 14 horsepower oil engine with a No. 5 or 6 cutter and screw bagger, costing about £250. For the farmer who only needs an engine for his own use, besides cutting a few tons of chaff for sale, I consider a petrol engine is cheapest and best. The necessary plant in motor power can be purchased for £100, including enginehouse. This consists of a 5-horsepower engine, No. 4 cutter, with 14ft. elevators, capable of cutting 1½ tons per hour with two men. The average farmer would not chaff 100 tons per year. Taking that as a basis, to allow a little for cutting wood and grinding corn, the engine would be

working 65 hours a year, a little over five days. The advice to buy an oil engine because it will last a lifetime therefore hardly applies to the farmer. Petrol engine and plant costs £100 at 4 per cent. = £4 for interest; cost of petrol, £2; total, £6 per year. Oil engine and cutter, £150 at 4 per cent. = £6; kerosine, £1 10s; total, £7 10s. Saving on petrol engine, £1 10s. per annum. The petrol engine can be started in a few seconds. There is no firing up to be done as with an oil engine. When knives need sharpening, or more hay is needed, the petrol engine can be stopped because of the ease with which it can be restarted, thereby saving fuel and wear on engine. With a petrol engine you feel justified in cutting chaff in any spare hour if pushed for time, as no time is needed for preparation. I have often run a ton of chaff through in half an hour before sundown. This I would not think of doing if I had to heat up an oil engine. I have had experience with horseworks, oil engines, and petrol engines, and I place them in inverse order for value and effectiveness for the farmer. The time is coming when motor power will take a very important place on the farm. When the agricultural motor is perfected it will not only drive all the stationary machinery, but will do the ordinary farm work as well." In the discussion which followed, members were unanimous in the opinion that a farmer was quite justified in purchasing an engine of some kind to do such work as chaff-cutting, crushing, sawing, &c., as the work could be executed much more expeditiously than with the horseworks. They differed, however, as to which was the most suitable engine to install. Several spoke in high terms of the gasoline engines, while others preferred the oil engine. Messrs. Teague, Birks, the Chairman, and Secretary thought that the high speed of the low powered gasoline engines would not be conducive to long life of the engine. Mr. Hawkins pointed out that the speed of his 5 h.p. gasoline engine was only 350 revolutions per minute. He estimated the cost of benzene at 5d. per ton of chaff, and with a No. 4 cutter could cut up to 2 tons per hour. Mr. Birks agreed that the two classes of engines were for separate purposes. Mr. McEwin said his gasoline engine had given him every satisfaction.

Whyte-Yarcowie, August 20.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lock (chair), Walsh, A. and F. Mitchell, Ward, G. D. and G. R. Mudge, Pearce, McCann, Hon. T. Pascoe, E. M., and G. F. Jenkins (Hon. Sec.), and one visitor.

FARM LIFE AND SURROUNDINGS.—Mr. Pearce read the following paper under this title:—"I should be guilty of a leaning toward the very spirit which this paper seeks to alter were I to offer any apology for the title or substance of it. As a rule the subjects brought before this Branch are of a purely practical nature, having reference solely to matters of production and distribution of commercial commodities—in a word, how to make the most of our calling from a material point of view. The object of this paper is to draw attention to a point of view which is at least of equal importance. In a good and very ancient book the question is propounded, 'What shall it profit a man if he shall gain the whole world and lose his own soul?' (i.e., self). Whilst I do not intend to trench on ground here that properly belongs to churches and writers on ethics, I certainly do think there is a meaning attached to the words which should not be lost sight of in our very natural desire to advance our material interests. In the first place my appeal is for the cultivation of a love of order and beauty which are said to be the first laws of nature, and the tendency of which is to refine human nature. There are few farm homesteads on which it is not possible to grow trees. I like to see a variety if possible, but if this is not possible it is marvellous the difference the common sugar gum and pepper tree make if planted and protected. Yet even to-day we see homesteads almost if not totally devoid of trees. These should not only appeal to the æsthetic side of our nature, but because of their value as shelter to man and beast they have a decidedly utilitarian value. If the soil is a medium one which surrounds the home we can go further and grow ornamental shrubs. There are a number of these which are indigenous to Australia, and which with a little care and attention are easily grown. Among these I would mention our native wattle and a variety called the Cootamundra wattle, from a place of the same name in New South Wales. This may be seen exhibiting a wealth of blossom in many gardens around Adelaide. Then there is the native lilac and many others. It is also possible with a little extra preparation of the soil on a small area to grow that queen of beauty, the rose. These require attention in the matter of watering during summer and autumn, but as a rule if provision of water is made the women of the household will attend to its application. All these things tend to make a home. To turn from the surroundings to the home itself. It is pleasing to notice the change that is taking place

in the style of residence. In place of the low, rambling structures of 10 or 20 years ago farm houses are being constructed on modern and up-to-date lines, and are at the same time the result and the evidence of prosperity among their owners. And this is as it should be. We can remember the time when the home comforts of the farmer and family were only second to those of the lowest paid class of labor. In conversation with a fellow traveller recently he remarked on the prosperous appearance given to the Burnside Estate by reason of this feature. So that here as in most other cases attention to the ideal reacts on the material, and such homesteads would actually add to the selling value of these properties. But we must not forget the inside appointments, which should be convenient and comfortable, so arranged as to give the maximum of convenience and pleasure with the minimum of work and worry. We mere men should not forget that to sister woman the home is to a very large extent her 'world.' We have made it so, and the nature of her duties makes it so. Thus being so, do not let us forget the soul of the home. If there is a taste for music, cultivate it; if the taste is not there naturally, seek to create it. The same applies to art and literature. Every farmer's home beyond all others should at least have a small library of good books. Not only those bearing on his calling, which may be called 'tools of trade,' but books which are the legacy of the good and great of the past to us of the present, and which lift us into a purer atmosphere and open to us a larger world. If these things are provided and some leisure for their enjoyment there will not be the same craving for other and less profitable forms of recreation. But since tastes differ, and man is by nature gregarious and needs the rubbing up and brightening which is best attained by contact with his fellows, I think some means should be provided whereby the young life of our homes should be able to engage in sports and pastimes in each others company, and I believe if we followed the practice of those of other callings and set aside one half day per week in all excepting the very busy months we should all be the better for it. In conclusion let me say that all I have written or suggested in this paper will tend, in my opinion, towards training good citizens—refined, clean, and worthy; able to hold their own and to make that own worth holding, and who will be the best form of wealth any community or nation can produce." A good discussion followed, in which members agreed that more attention should be paid to the home and its surroundings to make all more attractive.

Yongala Vale, August 13.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Battersby (chair), F. and H. Miller, Lloyd, D. and G. Dowd, Edison, Chigwidden, Cooper, Scott, T. and W. Keatley, and Schmidt (Hon. Sec.), and five visitors.

WHEAT AT MARCH SHOW.—Members were of opinion that a better show of wheat would be obtained if the entries were reduced from three bags to 3 bush., and if free carriage were arranged both ways on the railway.

CABBAGE-GROWING.—Mr. Miller tabled a splendid specimen of cabbage, weighing over 20 lbs. He had conducted experiments in cabbage-growing, and found the best results were obtained when the ground was treated with a mixture of good stable and fowls' manure. The beds should be watered freely for a week before planting, to make them thoroughly saturated. The water could be conducted to the plants in drains. Blight could be kept off the plants by looking after them carefully, so that their growth was not impeded. In a discussion on blight, Cooper's sheep dip and wheat fungicide were recommended as remedies.

EXPERIMENTAL PLOTS.—The Hon. Secretary read an account of the experimental plots conducted at the local school, and the results of the season for 1909. The aim of the experiments was to ascertain (1) which kind of manure suited best for a certain variety of wheat; (2) at what depth to sow wheat; and (3) the best time for sowing wheat. The fallow plots were dug on June 15th, 1908, to a depth of about 6 in., just after a good rain, and, following Campbell's system of dry farming, they were cultivated after every good shower of rain. This was done with hoes to a depth of 3 in. on seven occasions, viz., June 19th, July 17th and 31st, August 14th, September 11th and 25th, and October 30th, 1908, and again on March 19th, 1909, with the result that the top kept fairly loose for a time and became exceptionally brittle and easy to handle, while the subsoil set down as firm as a concrete floor. The top looseness of the soil also did not last, and with the commencement of the summer weather it set down very firmly. From this it was concluded that subpacking in this district, where there is a solid clay bed near the surface, is not necessary. The stubble plots were broken up during very dry weather to a depth

of 5in. during February and the beginning of March, 1909, and cultivated twice with hoes to a depth of 3in. before seeding time, to break up all lumps. The following varieties of cereals were used:—King's Early, Smart's Early, Macbeth, Federation, Yandilla King, Silver King, Purple Straw, Marshall's No. 3, Dart's Imperial, Bearded barley, Cape white oats, English white oats. All the cereals were sown with the following manures:—Mount Lyell, Black Horse, and English superphosphates, bonedust, S.A. super., and guano super., and so arranged that each cereal was sown with six different manures. The quantity was kept equal with the phosphates, about 56lbs. per acre being used, but the quantity of bonedust was increased to about 112lbs. per acre, because the previous year's result was not satisfactory when it was used in the same quantity as the other manures. Each row had the same kind of manure as it had for season 1908. Stubble ground was manured with Mount Lyell, Black Horse, English superphosphates; fallow ground was manured with bonedust, S.A. super., guano super. There were 72 different beds in the plots, and as eight beds were sown at a time, seeding operations lasted for nine weeks. Care was taken to arrange the date of sowing for the beds in such a manner that each cereal was sown at varied dates, the intervals ranging from three weeks to five weeks. Seeding was commenced April 8th, 1909, and finished June 11th, 1909. By May 20th most of the crops were up, and in about a month's time it was seen that some were doing better than others; and while all looked strong and healthy plants, it was manifest that some made faster headway than others, especially early *versus* late sown. The following shows the results that were obtained with each variety of cereals and manures:—

King's Early Wheat.

On stubble ground Mount Lyell caused fastest progress, while Black Horse caused a thicker growth. The best heads and grain were produced by English superphosphate. On fallow bonedust produced the fastest progress and best growth, but the best heads and grain were produced by guano super.

Smart's Early.

On stubble ground Black Horse and English super. produced the best growth, but Black Horse produced the best grain, although not the greatest quantity; this was produced by Mount Lyell with inferior grain. On fallow bonedust produced the most vigorous growth, but guano super. produced the best grain and greatest quantity.

Macbeth.

On stubble ground Black Horse produced the best growth, also best heads and grain. On fallow guano super. produced the best growth, heads, and grain.

Federation.

On stubble ground Black Horse produced best growth, heads, and grain, while Mount Lyell produced next best grain. On fallow bonedust produced a splendid growth and a promising crop, but when the warm weather set in the crop went off, and of the other beds the crops were sown too late to produce good grain.

Yandilla King.

On stubble ground Black Horse took the lead, closely followed by Mount Lyell, with the result that Mount Lyell produced the best grain. On fallow bonedust and guano super. seemed to be rivals for foremost place, but finally bonedust produced the best grain and greatest quantity.

Silver King.

On stubble ground Mount Lyell produced best growth and grain, although of lesser quantity than Black Horse. On fallow bonedust took the lead all along, and produced the best quality and quantity of grain.

Purple Straw.

On stubble ground Mount Lyell made a good start, but was soon beaten by Black Horse, which also produced the best grain. On fallow bonedust, S.A. super., and guano super. made equal progress, although the crops were not sown at the same time, and guano super. produced the best grain and greatest quantity.

Marshall's No. 3.

On stubble ground Marshall's No. 3 fared very poorly, the crops being thin and scanty but the grain was good, and the best grain was produced by English superphosphates. On fallow same result as with Purple Straw.

Dart's Imperial and Bearded Barley.

On stubble Black Horse easily took the lead, but in the case of Dart's Imperial Mount Lyell produced the best grain, while in the case of Bearded barley Black Horse produced the best grain. On fallow bonedust, S.A. super., and guano super. produced equal growth, and the plants looked equally strong and healthy, but with Dart's Imperial guano super. produced the best grain, while with Bearded barley S.A. super. produced the best grain.

Cape White Oats and English White Oats.

On stubble Mount Lyell and Black Horse produced equal growth, but Black Horse in each instance produced the best grain, although in a smaller quantity than Mount Lyell. On fallow S.A. super. and guano super. kept up their rival competition from beginning to end, being sown at the same time, and only slightly beat bonedust; the crops of both manures were excellent, and produced the same standard and quantity of grain.

It may also be mentioned that while bonedust in most cases produced the most prolific growth, when the warm weather set in the flags of the plants dried off more quickly than with the other kinds of manures used. It was found that grain sown at a depth of 2½ in. to 3 in. did better than that which was sown deeper or shallower, and that crops sown in June were too late to do any good. Samples of grain of season 1909 were submitted for inspection.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, August 20.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Wishart (chair); Friend, Sibley, Plush, Player, Smith, Stephens, Ball, Swann, Thorne, Heggie, Salter, Matthews (Hon. Sec.), and two visitors.

MANURES FOR VINES.—Mr. C. P. Seppelt, who was unable to be present, courteously sent the following information respecting experiments carried out with manures at Seppeltsfield Vineyards:—"For the purposes of experiment the poorer land was selected where the vines were going backward and throwing very spindly wood. To-day these same vines are growing fairly vigorously and throwing splendid wood. The manure was broadcasted and ploughed in. Owing to the stiff nature of the soil in this block a new one was selected, and the manure was ploughed in 1½ in. deep. Manure was applied three times between 1901 and 1908, and although there was not the increase expected the vines have new heart the crop is increasing year by year, and the effects of the manuring will be seen for many years to come. Strange to say, vines manured (especially with the complete manure) will retain their leaves from seven to fourteen days longer than the unmanured ones. The grapes are more perfect through manuring and of finer quality, at the same time standing our severely hot summers better. Where the unmanured plots were badly shrivelled the manured plots were hardly affected. From the following table it will be seen that the complete manure has shown out best. I strongly advise anyone to use the complete in preference to the others, although it is more expensive and may not at first show such big profits after paying for manures; still the vines become vigorous, and it will pay in the long run. In fruit culture potash will improve the quality of the fruit, but our soils are so deficient in phosphate that it would be unwise to apply potash alone.

Table showing Increased Yield in Pounds per Acre over Unmanured Plot.

Kind of Manure applied to Plot.	Average of 1901, 1902, 1903	1904	1905	1906	1907	1908
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
No manure	—	—	—	—	—	—
Superphosphate, sulphate of potash, and sulphate of ammonia	258	558	429	736	992	1,203
Sulphate of potash and sulphate of ammonia	111	—	—	11	104	203
Superphosphate and sulphate of ammonia ..	90	371	—	371	511	521
Superphosphate and sulphate of potash	402	663	311	768	606	870

"[NOTE.—In each case where superphosphate was applied the quantity was 2cwt. per acre, and with sulphate of potash and sulphate of ammonia the quantity was $\frac{1}{2}$ cwt. each per acre.]"

A good discussion followed, in which members related their experience. Mr. Stephens had manured an old currant garden with super. and potash with very marked results. Excellent growth, plenty of wood, and increased returns of fruit. Mr. Thorne had drilled in super., and his vines had greatly benefited. Mr. Heggie had found super. gave increased wood, but no seeming addition to the crop. He had tried bonedust with better results. Mr. Salter favored bonedust. Mr. Plush had ploughed in super. and Thomas phosphate, and found great improvement in his orchard, though unable to say just to what extent in terms of cases of fruit. Mr. Smith favored bonemeal. He also strongly believed in green manuring by ploughing in peas.

Balaklava, August 13.

(Average annual rainfall, 15 $\frac{1}{2}$ in.)

PRESENT.—Messrs. Goldney (chair), Thomas, Neville, Anderson, Uppill, Roberts, Twartz, Tuck, Robinson, Traeger, Wagener, Spillane, Banyer (Hon. Sec.), and three visitors.

EXAMINATION OF STALLIONS.—Mr. Robinson read a paper dealing with the question of unsound stallions. He said the question of a stallion tax and certification of horses was now agitating the minds of prominent horsebreeders of the State, and there was a movement towards strengthening the hands of the Government. In connection with that it was worth remembering the successful horse parade at Balaklava recently, when 25 stallions were paraded for examination. With a view to showing what was being done in the other States, he read some extracts from literature. There was legislation in South Australia for protecting the people in various ways, including that for the prevention of the introduction of fruit diseases such as phylloxera. Seeing that horse-breeding was one of the most important industries, he thought it was necessary to have legislation whereby the quality of horse stock could be regulated, and the industry allowed to progress on the best lines. It was not a matter of whether they were in sympathy with the movement for certification or not; it was absolutely essential to get in line with the other States to protect themselves. South Australia had been made the dumping ground for "crook" horses from Victoria. He had it on good authority that a syndicate had been formed to gather up all stallions that did not come up to the regulations, and these unsound horses had been sent broadcast throughout South Australia. The chief persons who were opposed to the movement in the question were those interested in the Adelaide stallion sales, and the only reason given by them was that it would interfere with the number of exhibits at shows. An agricultural society was doing more good with an exhibit of two sound horses than with 20 unsound ones, suffering from ringbone, sidebone, spavin, or otherwise faulty. All the States in the Commonwealth now had regulations similar to those in force in South Australia, and the effect of compulsory examination of stallions had been marked on the young stock coming forward. Queensland, which did not at once come into line with the other States, had since decided to do so. There was no doubt about the feeling of farmers in connection with the certification system, as at recent sales in Adelaide there was no offer for horses until it was stated that they carried certificates. Victoria was the first State to initiate the reform, and was the only State which had actually legislated in the matter. Legislation might seem

rather hard on persons who had paid considerable sums of money for horses that would be rejected as unsound, and perhaps it would be fair to give say a year or two to enable owners to recompense themselves for their loss. He thought the legislation should be, not only for stallions, but for mares as well, because hereditary diseases could be transmitted by the dam as well as by the sire. In New Zealand the mare had to be proved sound before being sold for stud purposes. South Australia should move on the same lines. If they refused to purchase or accept services of uncertificated horses, whether stallions or mares, in time they would practically have only sound stock, because owners of unsound animals would find that there would be no use for their unsound stock, and they would either castrate their stallions or get rid of them in some other way. In some of the American States the system of certification had proved most satisfactory to breeders. In the State of Wisconsin it was even insisted that an absolutely correct description of the horses offered for public use with pedigree should be given, so that those using them might know exactly what to expect from the mating. The State of Illinois, finding that the legislation of Wisconsin had driven inferior stock into its territory, passed a law which called for the enrolment in the office of the Bureau of Agriculture of all the stallions intended for service, and these had to be described in detail and carry a certificate of absolute soundness. All this went to show what was being done. South Australia was in unison with what had been regarded as essential in other parts of the world. Mr. Robinson then read from a Victorian Government bulletin extracts showing the results of the certification system there, and dealing with the question of transmission of diseases, such as sidebones, &c. In the discussion which followed Mr. Thomas upheld the action of the Government in the matter. Breeders should be protected against unknowingly accepting the services of unsound stallions. Mr. Anderson had advocated the views expressed by Mr. Robinson for years, and he was pleased to see that they were becoming practicable. He would like to see more stringent examinations than those at present made. The present ones seemed to be for blemishes that almost any man might see for himself. There should be internal as well as external examinations. Mr. Twartz was opposed to the system of voluntary examination. It should be compulsory to be of use. If hereditary diseases applied to mares as well as to stallions the examination should be applied to both. Stock for stud purposes should not be allowed to come into the State without a certificate of soundness. At present a diseased mare might be let in. He thought the present system might make owners chary about showing their horses for fear of having them found unsound. Then inspectors were not unanimous in their decisions. It had been known that horses rejected at one show were the best at another. Mr. Roberts favored a stallion tax. There should be internal examination as well as external. Mr. Uppill favored a stallion tax or something of the sort. He was at the Congress last year when the question was discussed, and there seemed to be unanimity among the delegates. There was something in what Mr. Twartz had said about inspectors differing, but such difference occurred among doctors on examination of a human patient. A man would be more particular in buying a horse if he knew it would be rejected if unsound. Altogether, he thought the move towards the protection of those requiring the services of a stallion was in the right direction. Mares that were brought into the State for stud purposes should be subject to examination. Mr. Neville thought it was a good move on the part of the Government to require examination of stallions. He had had a good deal to do with the stallion business, and got into a lot of trouble over it last year. He said at the time the examination was a good thing, and said so still. Some 20 years ago, when ringbone and other diseases were on the increase in England, the agricultural societies did what was now being done in Australia to provide for stallions to be inspected by veterinary surgeons. Since then unsoundness in horses had been on the decrease. In Scotland the same beneficial effects had resulted from the action of agricultural societies in adopting the system of examination. Those examples proved that their stock officers were not making any mistake. The Government had the power of withholding the subsidy to societies which granted prizes to owners of horses without certificates. It was said that this system would spoil shows, but the recent horse parade at Balaklava had shown that that was not likely to be correct. In regard to mares, it was possible to go too far. The Government should not prevent a man from using a horse for his own purposes, but should have the right to say that an unsound horse should not be travelled for hire. Mr. Spillane agreed with the views expressed by Mr. Robinson, and thought the protection might be even more stringent. Mr. Traeger favored examination of stallions. A horse which he believed was unsound was recently sold for £108 at an Adelaide sale. Mr. Wagener favored a stallion tax, and also examination of mares as well as stallions. Horses rejected as unsound in Victoria and New South Wales were undoubtedly sent into South Australia, and if that went on they would have only unsound horses in the

State. Unsound horses should not be allowed to enter South Australia. Mr. Roediger hoped that the steps taken by the Government were only the thin edge of the wedge. He did not think unsound horses should be travelled. Mr. Robinson, in replying, said it was only a question of a few years for the system of examination to have a beneficial result on the stock of the State. The fact of having sound sires would be shown in the stock, even though the mares might not be certificated as sound. Though present examination was what was called external, a man with the experience of the Government Veterinary Surgeon easily detected a horse that was likely to be unsound internally. They did not like the thought of having to submit to compulsion, but if they were coaxed along by some voluntary system, in time they would have their hands so strengthened that it could be made compulsory. If farmers would not ask horseowners for certificates before accepting service of a horse, that was their own lookout, and neither the Government nor anyone else could do anything for them. Finally the following resolution was carried:—"That this Bureau views with alarm the introduction of unsound horses into this State, and upholds the Government in the action taken in the matter."

Clare, August 19.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. McCarthy (chair), Miller, Pink, Kelly, J. and I. Radford, Lloyd, Daley, Jarman, Scales, Berridge, Keane, Pryor, McKenzie, Maynard, Patullo, Mayor, Dux, Pascoe, Lee, and Knappstein (Hon. Sec.).

MANURING ORCHARDS AND VINEYARDS.—Mr. F. Lee read the following paper:—"Upon coming into the Clare district recently to reside one of the many things which impressed me was the diversity of soils in which fruit trees were grown; also the shallow depth and comparatively poor quality of certain of these soils. You will understand how this should impress me when I state that in parts of the Mount Lofty Ranges I knew of apple trees eight years of age as big as and bearing as large crops as the majority of trees here 12 to 15 years old, and besides that looking far more healthy and making more vigorous growth. The cause is not wholly the result of the difference in the rainfall, which farther south is rather in excess of what it is here; but, in my opinion, is in the quality of the soil. I have in my mind several Gansell's Bergamot pear trees attaining a height of 60ft. or more, with a girth of 6ft., bearing 30 to 40 cases per tree; and apple trees bearing up to 40 cases each, and, perhaps, 40ft. high. These trees are growing in alluvial soils several feet in depth, with a subsoil of clay, not necessarily in gullies, but in many cases far up the hillides. These trees are perhaps 70 years old, and still growing vigorously and cropping well. I believe in some of the choice gullies here they would grow like that in time, but in the majority of orchards, where the soil is shallow, the trees after attaining a fair size apparently stop growing, and in numerous cases the fruit deteriorates year by year for the simple reason that the nutriment in the soil becomes exhausted and the wherewithal to feed the plant has not been replaced. I know of an instance this year which to my mind proves this. When we experienced the phenomenal unseasonable rains in March a certain orchard had a fair crop of apples on the trees of medium size. After the rain the apples grew to about twice the size, but they did what I have never seen before—the greater number of them shrivelled, even while left on the trees to mature. The conclusion I arrived at was that quite as a natural course the fruit absorbed a large amount of moisture, but owing to the lack of fertility of the soil they were unable to take up sufficient flesh-forming constituents to make the fruit firm and solid, practically nothing but water being taken up, and then being thrown off. In dealing with the question of manuring I call to mind an axiom which says, 'Manure your crop, not the soil'; in other words, put into the soil those constituents which are lacking, and which are necessary for the production of the finest crop, whatever the crop may be. It might help us to remember that practically all plants are built up of the same elements, combined together in different proportions. They are carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, silicon, chlorine, and several metals in combination, including potassium, and it is the relative proportions of these various elements which make the great differences in the chemical composition of various plants. Each element, with its combinations, has its function to perform in the growth of the plant, which it is not necessary to go into. But let it be sufficient to say that most plants contain at least 60 per cent. of water, which is a combination of hydrogen and oxygen. Carbon, hydrogen, and oxygen in certain proportions give us the carbo-hydrates, viz., starch, sugar, gum, &c.; nitrogen, with the above elements and sulphur, the nitrogenous portion of the plant, and these portions, totalling about 98 per cent., are chiefly supplied by the

rain and air, while from the soil is extracted the remaining 2 per cent. Now, that does not sound very much; yet if the potassium or the iron, or any of the others, are not present in sufficient quantity, then the plant suffers. Our object, then, is to return to the soil a portion of the food necessary for plant growth. Most of these constituents are present in all soils, more than sufficient for plant growth with the exception of three of four, viz., potash, phosphoric acid, nitrogen, and sometimes lime; and these are the constituents we must add to the soil to assist it in its function of feeding the plant. Fruit trees, although very exhausting to the soil, are neglected perhaps more than any crop when it comes to manuring, and yet it is not reasonable to expect that they can go on removing nutriment from the soil and the soil remain fertile. Potash enters very largely into the composition of fruit of all kinds; so does phosphoric acid and nitrogenous matter. Further, the nitrogen promotes the formation of sugar in fruit, so we may be safe in saying that a good manure contains those ingredients. Potash is perhaps the most important, being required for the formation of the flesh or substance of the fruit. Phosphoric acid imparts vigor to the tree, and occurs in the seeds of fruit in a greater proportion than in the other parts of the fruit. Nitrogen is required for the formation of the albuminous matter of fruit, and stimulates the leaf growth. There are on the market at present various forms of complete fertilisers for orchards. These contain approximately 2 per cent. to 3 per cent. nitrogen, 15 per cent. phosphoric acid, and 7 per cent. to 10 per cent. potash. This is a good manure; but to my mind, while there is sufficient nitrogen and phosphoric acid, there is hardly enough potash, and if using this for apples I should be inclined to make the potash contents about 15 per cent. by adding about 6lbs. sulphate of potash to every hundredweight of the fertiliser, and applying these at the rate of 4cwts per acre. This would cost 32s. 6d. per acre, or 4½d. per tree, which is not a very large outlay. It only means about an extra 7lbs. of apples per tree—at 2s. 6d. per case—to pay for the manure, and this should be easy of attainment. Of course that would be varied according to requirement. For instance, in my orchard I have a block of trees which are very stunted in growth. The fruit is a fair size, but the trees are very small, and the foliage exceedingly scanty. This particular soil I take to be lacking in phosphorus for the stamina or vigor of the tree, and nitrogen for the leaf growth; consequently these trees will have more nitrogen applied in the form of sulphate of ammonia in addition to phosphatic manure. The potash in this case will not be so important. Other trees again, while making fair growth, have only grown miserable specimens of fruit, and they will get a little extra dressing of sulphate of potash. Stone fruits, peaches, apricots, plums, &c., require rather more liberal manuring, and show more readily the want of nitrogen. For these trees, if using a complete fertiliser, I should add about 5lbs. sulphate of ammonia and 5lbs. sulphate of potash to each hundredweight of the other manures, and apply the whole at the rate of 5cwts. per acre, at a cost of £2 or 4½d. a tree. If not using a complete fertiliser, a good mixture would be 1cwt. sulphate of ammonia, 1cwt. sulphate potash, and 2½cwts. superphosphate per acre, which would cost approximately the same, and contain the same percentage. Vines require somewhat different treatment, being a more exhaustive crop than fruit trees, particularly of nitrogen, potash, and lime. In soils where lime is present in the shape of limestone I should put on 1½cwts. sulphate ammonia, 2½cwts. superphosphate, and 1cwt. sulphate of potash per acre to do it properly. This would cost about £2 15s. per acre, but at the present price of currants this should not be excessive. For the land which is poor, and where lime is absent, 1½cwts. sulphate ammonia, 1cwt. sulphate potash, 1cwt. super., and, if lime had not been added, 2cwts. gypsum. A good fertiliser, however, is to sow field peas as early as possible at the rate of 1busfl. per acre, with about 1cwt. bonedust and 1cwt. superphosphate. Plough them in about August or September, and add 1cwt. sulphate potash per acre. The peas collect nitrogen, and in being ploughed in add this to the soil as available for the trees, besides keeping the soil free and moist and cool during the summer on account of the added humus. The super. provides a quick-acting manure for the peas. The bonedust, not being so easily soluble, provides a future store of phosphoric acid for the use of trees. The potash, being easily soluble and applied as soon as the trees commence their growth, is available when needed. I am a great believer in lime, not so much on account of its value as a fertiliser, but because of its mechanical effect on the soil, especially on clay loams. The addition of lime to clay, owing to its power of coagulating the fine particles of clay, prevents it to a great extent from forming a sticky mass when wet, and cracking and forming lumps when dry. While it does that, it also acts in the opposite way, increasing the cohesive power of soils. It also has a chemical action. It sweetens sour land by neutralising free acids, and releases insoluble potash salts, making them available for plant food. Gypsum acts in the same way by setting potash free." In the discussion which followed Mr. Pink asked whether it would be an advantage to manure young vineyards. Members thought it would be, and also advocated when

planting young vines to put a pint of bone manure and superphosphate mixed in each hole, but to be careful that it did not come in close contact with the roots. Mr. Daley thought it was best for every orchardist and vigneron to experiment for himself as to which was the best manure to use on his particular soil, as different soils required different manures.

Freeling, August 12.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Elix (chair), Heinrich, M. J. A., C. H., and A. Mattiske, H. and C. Koch, Shanahan, Neindorf, Schuster, Kleinig, Harvey, Leske, Elliott, Steinfeldt, and Block (Hon. Sec.).

TIMBER PLANTING.—Mr. Heinrich read extracts from the *Register* of July 26th on this subject, including reprints of papers read at the Angaston and Naracoorte Branches. General discussion ensued, in which all agreed that while a little in the direction of timber planting had been done in the past much more vigorous efforts should be put forth. In reply to a question, Mr. Heinrich said sugargums grew best in this district, but some of the pines also did very well. Several members spoke strongly in favor of securing some land for the Branch to experiment with a view to determining what trees were best suited to this part of the State.

Gawler River, July 23.

(Average annual rainfall, 18 in.)

PRESENT.—Messrs. J. H. Dawkins (chair), A. M. Dawkins, Leak, Hillier, Roediger, and Bray (Hon. Sec.).

GYPSUM.—Mr. Roediger reported that for two years he had used gypsum mixed with stable manure on sandy soil. He had not obtained such good results from this as from the use of mineral super. alone.

DEEP v. SHALLOW PLOUGHING.—Mr. A. M. Dawkins considered that deep ploughing was beneficial in most soils, although under certain conditions better results followed shallow ploughing. Deep ploughing required a larger amount of horse strength, and to secure a firm seed bed more cultivation was necessary than for shallow working, but where the soil was suitable the results amply repaid the farmer for his trouble. The Chairman was accustomed to fallow to a depth of 5 in. or 6 in., and as the season advanced he ploughed shallower, working in this way first one field and then another. Mr. Roediger usually ploughed about 5 in. deep, and found that gave satisfactory results.

Gawler River, August 19.

(Average annual rainfall, 18 in.)

PRESENT.—Messrs. Dawkins (chair), Dunn, Davis, Hillier, Rice, Leak, Winckel, Bray (Hon. Sec.), and one visitor.

EXAMINATION OF STALLIONS.—Discussion on this subject took place. Mr. Dunn was of opinion that horses for breeding purposes should not be admitted to the State until examined and passed by a veterinary surgeon. At present the rejects from other parts of Australia were being sent here. He thought the present system of examination did not go far enough. Mr. Fisher thought three veterinaries should work together, and that final decisions should not be left to one man. Mr. Dawkins considered that examination of stallions should be made compulsory. To avoid hardship to owners, a period of five years could be given before prohibiting the use of unsound animals for breeding purposes. No unsound horse should be allowed to enter South Australia. Mr. Davis said that most of the imported horses at the last Adelaide sales were faulty. Some decided action should be taken to prevent the importation of diseased stock. He thought seven years should be allowed to owners of unsound stock in which to dispose of it, so that hardship might not be inflicted. Finally, it was resolved that, in the opinion of this Branch, "it should be compulsory for all stallions in the State to be examined. Any under two years failing to pass the standard should be castrated. Unsound horses over two years old to be allowed five years, and then to be castrated. After five years no unsound horse to be kept or used for stud purposes. No horses to be admitted to the State for breeding unless sound."

Nantawarra, July 20.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Sutton (chair), Smith, Sleep, R. and J. Nicholls, Greenshields, Dall, Gosden (Hon. Sec.), and two visitors.

MAGPIES.—Mr. Sleep was of opinion that the protection of magpies should be removed, and people allowed to use their own discretion as to destroying them. If they proved to be a nuisance by pulling up the young wheat plants and by destroying the young poultry—and this was his experience—one should have the right to protect his property by destroying them. Mr. Greenshields agreed. Messrs. R. Nicholls, and Herbert said the magpies destroyed mice, destructive insects, &c. It was a beautiful bird and grand songster, and it was a pity to sacrifice it for the sake of a little extra production. They were glad it was protected. They would not permit a magpie to be destroyed around their homes.

MARKETING WHEAT.—Mr. Dall referred to the weighing of farmers' wheat by the merchant. The farmer did not get full weight. If a bag of wheat weighed 160 lbs., the farmer was not paid for the 4 lb. The loss on two or three thousand bags amounted to a good deal. Members considered that provided the scales were recording weights correctly there was little to complain of.

Nantawarra, August 17.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Sutton (chair), R. and J. Nicholls, Smith, Greenshields, Dall, Sleep, Sinclair, Dixon, Gosden (Hon. Sec.), and one visitor

CROPPING ONCE IN THREE YEARS.—Mr. Jas. Nicholls read the following paper dealing with this popular system of cereal-growing:—“In this district it has been the practice to crop the land once in three years; that is, to take off a crop of wheat one year, graze the next year, and fallow the next. The fact that it has been almost universally followed is proof that the system has much to commend it. Still, circumstances alter cases. In view of the great rise in the value of land, price of horse stock, cost of labor, and the generally admitted fact that of late years the land has become much more consolidated, requiring greater horsepower to plough a given area, and thus making the operation of fallowing more costly, it is, I think, worthy of our consideration as to whether the practice of cropping only once in three years is the best under the conditions that now prevail. During the last year or two there has been a slight departure from this system, and the results have been such as to justify a more general departure, by taking two crops in succession after fallow, then grazing for one year, then fallow, or graze for two years after cropping and then fallow, thus taking two crops in four of five years, as the case may be, instead of one in three. That in this district wheat is the safest and most profitable crop to grow on fallow ground will be generally admitted. Oats and barley will not do so well on fallow, because of their liability to lodge and shake out owing to rank growth. As to what should constitute the second crop there will not be such unanimity of opinion. Some favor wheat again. One reason for this is that occasionally it does well; another reason is the fact that there is always a ready sale for this grain. Others prefer oats or barley for the second crop, both of which, should the season be favorable, do well on wheat stubble land. The former gives a good yield of either hay or grain, and is credited with improving the land as far as its wheat-growing capabilities are concerned. We have had ample evidence of the fact that when land has grown a crop of oats the following crop of wheat is not nearly so likely to be affected by takeall. By the way, this takeall trouble is one of the greatest evils wheat-growers have to contend against, and so far we have little to thank scientists for any remedial measures suggested by them. The wheat plants affected by takeall are easily detected, and the fact that growing a crop of oats lessened its effect on the succeeding wheat crop was known in this district years ago. But to return to our subject, barley may be grown, and yields fairly heavy crops of grain on stubble land, and on some of the lighter soils gives a much better financial return than wheat—that is, on stubble land. Both oats and barley may, if necessary, be sown before the autumn rains, when the land is in a dry state. This allows their being sown before the time for sowing wheat, a great help in a season when the rains are late. Another consideration worthy of note is the fact that if oats and barley are drilled fairly thickly with a liberal dressing of superphosphate they get the better of the weeds which are generally present when the seed is sown before the first rains. The fact that after the first rains oat and barley stubble land grows a larger and much earlier supply of greenfeed suitable for fattening lambs intended for export than does wheat stubble land is also worthy of consideration. Supposing the cultivation of oats and barley should become general over a large area, the question arises as

to the disposal of the produce. The price of these products, as we know, occasionally recedes to a very low level. Nevertheless, if extensively grown very much larger quantities of hay and grain might with advantage be fed to stock on the farm. Under the present system we have a surplus of feed during the spring of the year, but the number of stock kept independent of working stock is regulated by the amount of feed available in the fields during the other periods of the year, and I feel satisfied that by utilising the produce in this way the number of live stock raised on the average farm might be increased by 100 per cent. By these means we could put into practice the theory advocated by Professor Lowrie of carrying more of our produce to market on the hoof, and lessen the drain on the fertility of our lands. Even if this were not practicable, we know that the production of large quantities would lead to the building up of an export trade, and consequently there would be a more regular demand. We know that every few years the eastern States have to import large quantities of fodder from South Australia at prices very satisfactory to the seller. During a recent trip from Adelaide to Brisbane and back, with *detours* into the agricultural country by the way, I was much struck with the small number and diminutive size of the stacks of hay to be seen on the farms. The largest I saw on the whole trip belonged to farmers who hailed from this State, and the principal ones to farmers who went from this particular district. There are of course many other things that might be grown, perhaps profitably, but I have purposely confined my remarks to cereal crops, and for the reasons stated in the first part of my paper have endeavored to compare the two systems, the advantages and disadvantages of which will of course vary with the seasons; but should the present seasons continue the system I have mentioned is, I think, worthy of a trial." Considerable discussion followed. Mr. Sleep agreed with most of the paper. There was no doubt that the land became more solid by reason of the mat-like roots of extra grass, &c., following the use of fertilisers. Land cropped once in two years would not settle down so much. He thought when all stumps were out of the ground it would be better in every way to use the plain land plough with a coulter and shining mouldboard. He would retain the stump-jump plough for stony patches, where it would do good work, but on the plain ground it simply dragged or scratched a rut and made hard work for the horses. Mr. Dall could not agree with this. During the week he had tried both ploughs, and had to discard the plain land plough because it would not go in. Mr. Herbert thought if all farmers followed the mixed cropping plan the value of oats and barley by reason of the increased supply would fall very low. Even if some profit were made under this system the expense of labor would more than absorb it. He thought the present system of cropping once in three years would pay best. Mr. Nicholls again pointed out that at present there was not sufficient oats or barley grown to cause an export trade, but he believed that such a trade could be rapidly built up if these cereals were grown by the farmers. They could then expect good value for their oats and barley. Mr. R. Nicholls said the present high and increasing values of land would necessitate its being put to better use. A good deal of land was too dear to carry sheep profitably. He did not agree with the writer in regard to the order of cropping. He believed it would be preferable to crop first with wheat, next year with oats, and then fallow, putting additional work on the land to clean it. He was carrying out the following experiment:—A paddock of 200 acres, which was under wheat crop last year, he had this year divided into two equal sections, and drilled one with oats and the other with wheat. Next year he purposed cropping the same land, but would drill oats on the land now under wheat, and *vice versa*, and find out the effect. He was of opinion that two good wheat crops in six years would pay better than the system advocated in the paper.

Northfield, August 23.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Williams (chair), Dall, Kelly, Kimber, Kemp, Mitchell (Hon. Sec.), and two visitors.

KEEPING VEGETABLES AND CEREALS TRUE TO TYPE.—The Chairman read a paper on this subject. Taking potatoes as an example, he said a variety which produced tubers true to type could be kept true by selection. Not by merely selecting "good" seed, but those tubers which were true to type in every particular—shape, color, &c. These characteristics could be noted in spite of certain changes in appearance and flavor, which were brought about by growing a variety in a totally different soil in perhaps a different district. In dealing with peas, such as the Yorkshire Hero, the usual practice was to pick all the large and early pods and market them as green peas. The pods that came on later were gathered with the straw when ripe, thrashed, and sold or sown as seed. These

instead of containing eight or nine apiece, had perhaps two or three each. As the result the true type was lost and an inferior pea was produced next season. If the best pods had been selected for seed the good qualities of the variety would have been maintained. The same rule applied practically to all vegetables. Dealing with wheat he said, "We have now so many good varieties of wheat—rust-resisting, bearded, and beardless—some especially adapted for producing hay, and others for producing an abundance of grain. The farmer of to-day has to consider how to keep these wheats true to type, and if possible to improve them. Farmers who do not practice hybridizing wheat may do a great deal in keeping the type, and perhaps improve the quality by selection. This must be done by selecting the heads before reaping. Heads of wheat vary considerably in size and shape, and some will mature earlier than others. Therefore much can be and has been done by selecting. It is commonly believed that change of seed from one locality to another is sufficient, but while that may help to increase the production if the change be suitable it will not keep wheat true to type or improve it. I know that the process of selecting heads by hand is slow and involves a deal of labor, but if it does not pay at once it will in the long run, and is the only way to maintain good varieties of wheat true to type."

Salisbury, August 2.

PRESENT.—Messrs. Moss (chair), Sayers, Kuhlman, J., E., A. J., and A. H. Harvey, Laurie, Heier, Bagster, V. and L. Jenkins, Allington, Richardson, Tate, E. and R. Whittlesea, Bayliss, Ridley, Goodall, Frost, Bussenschutt, McGlashan, Short, James, Sabine, Jenkins (Hon. Sec.), and three visitors.

SOURCES.—Discussion took place as to the best way to deal with these weeds. It was agreed that they were difficult to deal with on farm land. If they were ploughed under immediately before sowing, the wheat got a good start, and good yields might be expected. The weeds could only be eradicated, however, by constantly working the soil for two or three years, and this was impracticable. In the local gardens they were rather useful, as they grew early and held the soil against floods, while in the summer they withered away.

THE AESTHETICS OF THE PRODUCER'S LIFE.—The Chairman read an excellent paper pleading for a fuller realisation on the part of the rural population of the beauties of nature by which they were surrounded. This would lead to the fuller enjoyment of life, mental uplift, and contentment. It also had its economic value, inasmuch as the fuller development of the love of beauty and order would result in a desire to have only the best class of horses and other stock. Makeshift sheds and fittings, which long ago served their purpose, would give place to more adequate improvements. A pigsty with half a roof and no floor would no longer be tolerated. "Fences broken and awry would appeal for repair by their very ugliness." "The dreary monotony of bare surroundings would give place to useful shelter trees." It was strange that on some homesteads which had existed for half a century no attempt had been made to add to their value and attractiveness by planting suitable trees and other vegetation. He thought the younger generation of cultivators showed more desire to improve holdings in this way, but time was still grudgingly spared for this work. Many men who had secured enough to retire, found themselves unable to enjoy the leisure they had obtained because they had been so busy making money that every other faculty had been left undeveloped. [We regret that we could not print this paper at length.—Ed.]

Stockport, August 15.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Nairne (chair), Stribling, Smith, Perry, Thomas, Megaw, Stevens, Godfree, Whitelaw, Watts, and Murray (Hon. Sec.).

PLOUGHING-IN *versus* BURNING STUBBLE.—Discussion arose upon this subject. Members finally agreed that ploughing-in stubble before rain, if possible with a disc plough, and then ploughing again for fallow later on was better than burning off the stubble.

EIGHTEEN YEARS HON. SECRETARY.—At the annual social of the Branch the opportunity was taken to present to Mr. J. Murray, who had filled the position of Hon. Secretary since the inception of the Branch, 18 years ago, an enlarged photograph of himself, suitably inscribed. In making the presentation, Mr. J. Smith, one of the foundation members

spoke in the highest terms of the excellent services rendered to the Branch and, through it, to the district, by Mr. Murray. These sentiments were heartily indorsed by several other speakers.

Watervale, August 15.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. E. E. Sobels (chair), F., F. L., and A. S. Burgess, G. and F. Hunter, Solly, J. and F. Hamp, Scovell, T. W. Sobels, Smith, Ward, jun., Field, Baker, and Duke (Hon Sec.).

CITRUS FRUITS.—Inspection of some lemons of abnormal shapes led to a general discussion on citrus fruits. Some considered the thick rind on oranges was caused by deep, rich soil; others thought it due to climatic conditions. The Chairman had in Sydney seen Salisbury, Renmark, and Parramatta oranges side by side, and in many instances the South Australian fruit was the finest sample, but it had a thicker rind. Mr. F. Burgess thought oranges could be improved in this respect by manuring the trees in winter, watering in summer, and keeping them open. It was stated, however, that the climate in this district was rather too severe in winter for the fruit to ripen properly. Mr. Smith had kept oranges on the trees for nearly a year after they began to ripen, and when picked they had a splendid flavor.

WHEATS.—The Chairman said that Gluyas and John Brown wheats were doing very well in this district; the former promised to be a good hay crop. Huguenot was being more widely grown, and Mr. G. Hunter had cross-drilled this variety with oats, applying a liberal quantity of super., and a very promising hay crop was the result.

ARSENATE OF LEAD AND BEES.—Local beekeepers were said to have complained that the arsenate of lead spray used on trees had been responsible for the deaths of some of their bees. The Chairman wished to know whether any reliable information was forthcoming on this subject. [Can any reader answer this question?—ED.]

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Kadina, August 25.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. Correll (chair), Pedler, Martin, Paterson, and Southwood (Hon. Sec.).

TAKEALL.—Mr. Pedler initiated a discussion on the subject of "Takeall in Wheat." He said more money had been lost owing to the ravages of takeall than of rust. The condition of the land had a lot to do with it. Light fallowing and a free light soil seemed to encourage it. Some of the grasses were affected. Barley grass and spear grass, for instance. Crops on well-worked fallow did not seem so subject to it as others. Stubble or grass should be burnt off before fallowing. The land should be fallowed in July so as not to allow the herbage to mature. The custom locally was to crop the land every three years, having it fed off one year, fallowed the next, and cropped the following year. Takeall was encouraged by continually cropping with wheat and thus impoverishing the soil. Oats should be sown on land affected by takeall as the disease could not attack the oat plant. Discussion followed. Mr. Martin had noticed that wild oats were attacked by what he took to be takeall, and that from takeall patches millions of small flies arose at harvest time. Stock seemed to like to feed off the takeall patches rather than the other parts of the crop. The takeall came up in the same spots each season, only it extended its borders. His experience was that it was best to crop land so attacked with oats. Mr. Paterson first heard about takeall 40 years ago. Applications of lime to the soil seemed to do good, and the following year there would be no takeall. Mr. Correll said unfortunately the subject of the discussion was not understood. They were but at the investigating stage. There had been dozens of discussions at the various Branch Bureau meetings during the year, and they were no nearer the solution. He had not before heard that lime was a cure. He had noticed myriads of flies arising from the patches

at harvest time—in fact, so bad were they that he had had great difficulty in getting the horses through. The flies came from grubs, and perhaps these had something to do with the takeall. They knew that if they tried to crop the same land in succession with wheat that the takeall increased. He had seen takeall as far back as 50 years ago. There were different kinds of takeall. That caused by exhausted soil was different from what they experienced where the land was rested. If the farmer did not rest his land nature did it for him at a greater expense. A rotation of crops would minimise the effect of takeall and renew the land. They could grow oats profitably. He believed it would pay a farmer to sow oats on affected land if only for fodder for the sheep. The land would carry quite double as much stock as if self-sown. He had about 60 acres of land that showed signs of takeall. He cropped it with oats and got nearly two tons of hay to the acre from it. It was profitable to grow oats, if only fed off. He hoped scientific research would go on, and that eventually something would be discovered which would overcome the scourge. Mr. Martin did not agree to the suggestion to feed off oats with sheep. (One year he sowed two paddocks of 100 acres with oats. He put 300 sheep on one and the other he cut for hay. He realised only £120 from the sheep, but he cut two tons to the acre of hay off the other paddock, which sold for 37s. 6d. per ton, so he lost by feeding off the oats with sheep. At one time they used to say what a splendid thing oats were for horses. Now the horses seemed to prefer anything rather than growing oats. Mr. Pedler, in reply, said he had not noticed the flies spoken of by Mr. Martin, and he did not think takeall was in any way caused by flies. If so it would spread all over the paddock rather than remain in the same spots. He thought it was due to a fungus. (The true takeall is caused by a fungus (*Phylobotus graminis*), but so far no effective preventive measures have been discovered. A reference to page 855 of May *Journal* will show the best precautions known at present. If patches of crop go off and appear to be affected by flies or grubs, a few of the plants should be forwarded to the Department of Agriculture for investigation as to the cause.—Ed.]

Maitland, August 6.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Opie (chair), Bawden, Bentley, Hastings, Heilman, Hill, Jarrett, Iutz, O'Grady, and Pitcher (Hon. Sec.).

BUREAU WORK.—This meeting took the form of a question box evening. In regard to lack of interest in the work of this Branch, the following reasons were suggested:—

1. An inadequate idea on the part of the members of the value of the Bureau system. 2. Because it was easier to read at home the information given by others and printed in the *Journal* than to attend meetings. 3. The work of the Branch was not made sufficiently attractive. Suggestions for improvement were—1. Regular plan of meeting and subjects. 2. The purchase by the Branch of agricultural publications. 3. A lecture by one of the officers of the department.

RETENTION OF MOISTURE IN SOIL.—It was stated that any tillage which reduced the soil to a fine tilth made it capable of retaining a larger amount of moisture when rain fell. Keeping the surface loose retarded evaporation.

INFLUENZA IN HORSES.—The following treatment was recommended for this complaint. Keep the animal in a warm place; put on the horse a noschag containing a hot bran mash to which has been added a teaspoonful of eucalyptus. The inhalation of the eucalyptus will be very beneficial.

WHEAT AT MARCH SHOW.—Members considered the expenses involved in competing in this section were too great in proportion to the prizes. It might be all right for those who lived near the railway. They further suggested that separate prizes should be offered for the best exhibits of individual varieties of wheat. They also thought a prize should be offered for a takeall resistant wheat.

Pine Forest, July 19.

(Average annual rainfall, 13 in.)

PRESENT.—Messrs. Johns (chair), Goodridge, Nelson, Carman, Inkster, Bayne, Edwards, Schultz, and Barr (Hon. Sec.).

IMPROVEMENT OF BUREAU MEETINGS.—The following rules have been adopted by this Branch with a view to facilitating the business brought forward from time to time:—

(1) A member introducing a subject for discussion shall be allowed 20 min.; (2) that

each member present shall take some part in the discussion, commencing with the one situated to the left of the Chairman, time limit 5min.; (3) that the person introducing a subject be allowed 5min. for reply to criticism and comments; (4) That the Chairman as last speaker, be also allowed 5min. before putting a motion to the vote. The mover, Mr. Edwards, speaking upon these rules, said he had felt the need of some such arrangement for some time. There were occasions when time would be saved if a little more restraint was exercised by those speaking to come more briefly to a conclusion. By adopting these rules members would become more interested, and they would do away with the wasting of time caused by one and another trying to be the next to occupy the floor. It would also encourage more thought before rising to speak. The time limit did not mean that members should speak for 5min., but merely that they should rise and state their opinion on the subject introduced for discussion. He hoped the new arrangement would be given a fair trial.

WESTERN DISTRICT.

Cummins, August 20.

PRESENT.—Messrs. Sabey (chair), Scholz, Nottle, Durdin, Sanderson, Johnson, Cooper (Acting Sec.).

CARE OF HARNESS.—A paper on this subject was read by Mr. Sanderson. At the outset he stated that brown harness was more durable than black. The former leather was in its natural state, except for tanning, while the black had been subjected to certain chemicals in dyeing which removed much of the natural grease and left the leather hard and dry. Oil could be applied, but did not fully restore the flexibility and wear-resisting qualities. For plough work, therefore, he recommended brown harness. To clean black buggy harness it should be taken to pieces and washed with warm water and soft soap, using a brush and plenty of "elbow grease." The paper continued:—"Hang the harness (not in the sun) to let the water drain off, and when dry apply on the inside of the various straps and parts a thin coating of neatsfoot oil. On the outside use Mellin's harness dressing. Apply lightly with a sponge, and a brilliant and glossy appearance will result. For a brown set the same method will apply, excepting for the outside dressing, for which use Harris's harness composition. For the buckles use Brilliantshine. For spring cart, dray, or wagon harness Lewis & Whitty's refined neatsfoot oil is the most useful preservative you can find, but in all cases the harness must be washed and dried before the oil or dressing is applied. On no account allow the oil to remain on the surface of the leather, or it will pick up the dust and make a thick greasy coating on the outside of the harness. Just put on sufficient to penetrate. Regarding the most important part of all, viz., the farm horse's collar, in purchasing a new collar, if the horse is in working order, have it just a trifle tight for him. Then soak it in water for about 10 or 12 hours, and let him work in it. He will soon pull that collar into the shape required to fit him, and will work in comfort. About six months after purchasing have the collar lined and stuffed, and it should be all that is necessary for your horse. If possible have a separate collar for each horse, and do not allow Bess to work in Nugget's collar. When drilling have leather throats in the collars: by so doing you will save pounds, as the pole straps soon cut a collar in two. On no account put too much oil on the collars; it is not required, and the oil penetrates to the straw, and when they are lined and stuffed they will not give satisfaction. When not in use place collars in the shade, especially when wet. Do not let the sun play on them, for it will draw on the straw and alter the shape altogether. When the collar is on the horse the body of it is on his shoulder, and is protected from the sun. Have all collars lined with check for farm work. It is cheaper and cooler. Leather lining looks very nice, and can be kept clean, but it gets very hot, and is likely to scald when the horse is perspiring. If you prefer leather lining, wipe it with a damp rag occasionally. Do not put any oil on it, or it will penetrate to the hair and take all the spring away. Sore shoulders are in most cases due to the fault of the driver. These bad sores do not occur in one day. It takes some rubbing to rub the hair off: still more to rub the skin off. That must be noticed when removing or placing the collar on the horse. Why not then attend to it? See if the draught of the hames

is on the draught of the collar; also see if the chains are exactly the same length. Look for any other little part that may be misplaced; see to it at once, and you will get better results from your horses and a lot more pleasure in driving them." A good discussion followed. Members agreed that it was a good practice to soak new collars as recommended in the paper. They were also in favor of having false collars for horses.

Elbow Hill, August 20.

PRESENT.—Messrs. Cooper (chair), Williams, Bunn, J. B. E. and E. R. Wake, Beinkie, Story, Bryant, Ward, Wheeler, Tilley, Chilman, G. F. Wake (Hon. Sec.), and six visitors.

FOLLOWING.—A paper on this subject written by the Chairman was read and discussed. In this dry district every effort should be made to conserve all the moisture which fell in the 12 months. Fallowing the land and working it rationally was the way to do this. The experience of South Australia had proved that the land would not continue year after year to profitably grow the same crop without some respite. He believed in fallowing early; say in March, if the land could be ploughed. This course captured the early rains, made the weeds grow, and enabled the farmer to get the land clean. In this district 3in. or 4in. was the best depth to fallow. It should be ploughed well, cutting not more than 7½in. Harrows and cultivator should be freely used on the fallow, especially after rain. This would retard evaporation and work the soil to a fine tilth, making an excellent seedbed. The land could not be put into a good state for the crop by cultivating when either dry or very wet. He harrowed a week after ploughing to kill the almost invisible weeds which had usually started by that time. Later on, when more weeds grew, he cultivated two or three times if possible, working more shallow each time. About three days after each good rain either the cultivator or the harrows were run over the fallow. A few sheep helped to keep the weeds down, but in no case must it be supposed that they would do instead of proper working. It was absolutely necessary to keep the surface loose to conserve moisture. Good discussion followed, in which the members agreed with the principles outlined in the paper. Mr. E. Wake thought it unwise to fallow as early as March if the soil was dry. He considered the harrows should immediately follow the plough. Reference was made to the liability of fallow to drift, but Mr. Wake thought this would not occur if the fallow was not worked down so very fine. Mr. Chilman said fallow would not drift if it was only worked after rain while still moist. Others spoke of the necessity for fallowing to obtain good crops. The Hon. Secretary thought it best to fallow early, ploughing very shallow, killing weeds with a light skim plough, and afterwards working 4in. or 5in. deep with a heavy cultivator. Frequent harrowing was essential to conserve moisture.

Merghiny, August 8.

PRESENT.—Messrs. Shorne (chair), Talbot, Moody, Barnett, Mulrooney, Symonds (Hon. Sec.), and five visitors.

SHOOT-CUTTING.—Discussion took place on the destruction of mallee shoots. Mr. Talbot thought it was best to cut the shoots when the sap was up. He used an axe or a shootcutter, and was always careful to bark the stump. Mr. Basham considered that shoots from small stumps should be cut below the surface of the ground. Thorough cultivation and fire were aids to destruction. Mr. Barrett suggested that possibly some cheap chemical might be found which would kill the shoots.

Miltalie, August 20.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. J. P. Story (chair), Searle, Smith, Howell, J. W. and E. Story, Alm, A. R. S. and A. Ramsey, Parks, Jacobs, Laffin, Hier (Hon. Sec.), and three visitors.

PIONEER FARMING.—The following paper was read by Mr. Searle:—"Pioneer farming to-day means going back on mallee scrub land which, before the advent of superphosphate, was considered unfit for cultivation purposes. This land can now be profitably used; but, unlike the arable and plain land of the North, it is a veritable desert as regards water, and this is a great drawback to the settler. Similar difficulty is experienced in regard

to fodder. Water is seldom found in mallee country (Pinnaroo excepted), but the Government, recognising the difficulties of settlers in this kind of country, has rendered assistance by the Advances to Settlers Act. In the first place the settler has to make provision for next year's crop, and to do this he must clear the land, for nearly every acre before it can be used costs a lot of time and labor. However, money is very plentiful and cheap. Firms give their valuable machinery without any money till the machine can pay for itself. So if a person has a team of horses and wagon and about £200, he can succeed on a selection from the Crown, but he will require in addition some backbone. My experience of waterless mallee land may be of some benefit to intending selectors. I rolled down 200 acres and put up a four-roomed iron house in three months. I then left till after harvest in another part. In February I returned with my family, burnt the rolled scrub, and, having to cart water seven miles, I hurried the seed in with disc harrow and seed drill, fenced it, and started on water conservation. I put down two cement tanks of 30,000galls. capacity, and have continued doing this kind of work until I now have about 120,000galls. storage. The bulk of the country on Eyre's Peninsula is of a sandy nature, and affords poor watersheds. Especially is this so until the soil becomes consolidated by working, &c. As I had a poor catchment area and a lot of light rains, I conceived it a wise plan to make an artificial watershed with roofing iron, knowing it would also be very useful for shed purposes. I first made a shed which used $1\frac{1}{2}$ tons of iron on the roof. This gave me for every inch of rain 1,500galls. The following year I put up another shed with 1 ton of iron, making in all 2,500galls. per inch of rain, or, with 14in. for the year, 35,000galls. This required two underground tanks. These sheds accommodate me with a 16-stall stable and a large engine and chaff shed, good enough for 50 tons of chaff; also implement and barn shed. Money spent in this way is the best investment. If I had to borrow and pay 20 per cent. interest I would do so, for water-carting is a killer. I would recommend the erection of only a temporary residence at first, as after a time there is more leisure in which to better select the site. I would also advise economy. The more we can deny ourselves at the commencement, the sooner we get out of the pioneering stage. When I first started 30 years ago I had no spare horses or light vehicle, so after ploughing all day would walk eight miles once a week carrying mail, groceries, meat, &c., on my back. If necessary, others could do likewise."

Mitchell, July 23.

PRESENT.—Messrs. Green (chair), Molloy, Ness, Ward, Head, O. and J. Green; McCormack, Dorward (Hon. Sec.), and one visitor.

FALLOWING.—The Hon. Secretary read a paper on "Fallowing" to the following effect:—As soon as possible after seeding he would plough the ground to a depth of, say, 6in., according to horse strength available. Two or three such ploughings as this would pull out most of the stumps. In this district the stumps came up easily, and only the big ones needed to be carted off the paddock. The smaller ones would decay in time and enrich the soil. He would not advise fallowing new land. Just as good returns had been obtained from new land as from fallow on his farm. As long as there were a lot of shoots to deal with he would alternate fallow with a crop of wheat, but when the shoots were killed he would only crop every third year. He preferred the tine cultivator for working the fallow, as it stirred the land well without turning under the sour soil, which should be exposed to the sun to sweeten. When the soil was in a suitable condition this cultivator would pull out a lot of stumps which had been loosened by the plough. Although a disc cultivator would cut off a number of shoots, that was only a temporary check, whereas if once pulled out the stump could be removed and would give no further trouble. He considered it unnecessary to continually work fallow in this district, as there were no weeds and there was too much rain. Early fallow, or land fallowed when very wet, should be cultivated to loosen the surface and admit sun and air. It should also be kept just loose enough for the drill to work well when seeding time arrived. Last season he ploughed some fallow back before sowing, some he cultivated, and some he drilled in as it was. The yield was the same from all, and he saw nothing to be gained from the extra labor. It was generally agreed by members that it was necessary to fallow to enable seeding to be done at the proper time. They also agreed that it did not pay to fallow new land on account of the mallee shoots. Some very poor returns had been realised from well-worked fallow, but it was thought the failure had been caused by excessive moisture. Mr. Molloy thought it a good plan to plough back the fallow before harvest and harrow it immediately before drilling.

SHOOT-KILLING.—Members thought the best time to cut mallee shoots depended upon the district and its climatic conditions. They would burn stubble or grass as early as possible after harvest.

Mitchell, August 20

PRESENT.—Messrs. Miller (chair), Ward, Ness, Head, O. P. and J. Green, Dorward (Hon. Sec.), and six visitors.

BUREAU EFFECTIVENESS.—A paper on this subject, from page 904 of the May issue, was read by Mr. Ward. In the discussion which followed the Chairman emphasised the need of hearty co-operation to make the Branch's work effective. Both young and old members could benefit from studying this paper.

COLT-BREAKING.—Mr. J. Green read a short paper on "Colt-breaking." A good yard made with rails up to 6ft. high was the first necessity. A strong post should be put in the centre, so that when tied to it the colt would not be able to damage himself on the rails. A very strong rope was needed for colts which had never been handled, as if they once broke away they would try again and again. It was best to handle the animals from the time they were six weeks old, tying them up occasionally. To break a colt into single harness the best way was to first harness it to a log by itself. It would then learn to pull alone, and go in single harness. The whip should not be used on young horses. It only served to make them timid. With time and patience much more could be done than by loss of temper and violence.

Penong, August 13.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Edwards (chair), Brook, Wold, Lovell, Olsen, Farrelly, Roberts, J. B. and J. Oats (Hon. Sec.), and two visitors.

EVERY MAN HIS OWN MECHANIC.—Mr. Brook read the following paper:—"In a district like this, where tradesmen are so scarce and we have so far to go to have anything done, it is best for every man to do as much of his own work as possible. Every man who goes into the country to live should be able to build a house, do his own cooking, wash and mend his clothes, castrate stock, shoe his own horse, weld a link, do most of his own blacksmithing, and mend harness. I have done a little of most things, and find it saves time and expense. Of course, it takes time and care to learn; but if you make a mistake, try again! The better the tools a man has to work with the better the work can be done. In shoeing make the shoe the shape of the foot, and then rasp the foot to make the shoe fit level. Never burn the hoof with hot shoes, as it hardens it, dries the pores, and causes corns. I have a mare 23 years old. With hot shoeing she could not go for two days without shoes; but since I have taken to cold shoeing she will go all the year round without them if required, unless I have her on the roads wheat-carting. 'Jack of all trades and master of none' is a saying I do not hold with. It is possible to master anything if we make up our minds to try, and try till we succeed. Never be too old to learn; and when you go to see your neighbors look round well. You may see something that could be improved on. And do not be too proud to ask how anything is done." Mr. Farrelly had done a good many of the various things mentioned, and thought a man with confidence could do most of the things necessary on the farm. Mr. Lovell thought a man coming out in the bush should be able to do a little shoeing, blacksmithing, &c. Mr. Grad agreed with Mr. Brook. He had done a little shoeing, &c. Good tools were necessary, as great annoyance was caused and unsatisfactory work performed with tools out of order. He wished to know if spirits of salts for soldering should be used in its raw state or killed. [See page 1002, June issue.—Ed.]

CATERPILLARS.—Mr. P. Farrelly wished to know how to cope with caterpillars. The Hon. Secretary thought fallowing would prevent them from breeding in the land where they now were so plentiful. Members said there were three varieties doing considerable damage—the large hairy one, a green one (the eggs of which were found on sticks, &c.), and a small black one. Mr. Brook wished the question to be answered through the *Journal*. [If samples of these were forwarded it might be possible to speak of remedies more positively. In the meantime a study of the index which accompanied the August issue will show that several references have been made to the general subject during the year. Page 466 of December issue gives a remedy. See also page 623, May 1907, and page 613, January, 1908.—Ed.]

ANNUAL MEETING.—The Hon. Secretary presented his annual report, which showed nine meetings had been held, with an average attendance of eight members. Number of members on roll, 15. Papers on the following subjects had been read and discussed:—"Takeall," "Harvesting," "Pig-keeping," "Well-sinking," "Plant Life," "Worms in Horses," "Dry Bible," and "Farming in Dry Districts."

Petina, July 30.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Penna (chair), Kenny, Goodhart, Doley, Howard, Simmons, Roberts, and Souter (Hon Sec.).

OLD v. NEW METHODS IN FARMING.—Mr. Doley read a paper on this subject, to the following effect:—"The old style of farmhouse was built with timber procured on the land; the cracks were filled up with pug, and in some cases they had a thatched roof. (On the up-to-date farm we see a substantial stone house with iron roof, which is a decided advantage. Sheds and stables on the old places are mostly covered with straw, which answers the purpose for a time, but each winter they need more straw, and then they let the water through and stuff is spoiled. With the weight of the wet straw also there is a danger of the structure giving way. This is being superseded on new places by roofing with iron, which is a money-saver in dry country in catching water. Windmills have replaced the windlass for hauling water, and in some cases we see motors and engines used with great success for this purpose. Big improvements have been made in chaffing hay and crushing and grinding corn, which used to be done by hand and horse power. This is being replaced by motors and other engines. More attention is being paid to all classes of stock. In olden times anything was good enough, but we have now been shown that it pays to keep the best. The result is finer types of horses, cattle, and poultry, which all go a long way to make farming a success. We see a vast difference in the preparation of the ground to sow the seed; in some cases, in my opinion, there are lessons to be learned from the old methods. In the old way a set plough at work cut a nice clean furrow to the depth of 5 in. or 6 in., and before the seed was sown the ground had been worked, either by harrowing (perhaps twice) or cultivated, giving the ground a good stirring up. The seed was then sown by hand or seedsower, and then harrowed again, where it was possible to work these implements. A stump-jump plough, with from three to 12 furrows, ploughing from 2 in. to 5 in. deep, is a long way from the old style. In a good many cases the land is not worked again except by the drill going over it. A big lesson is to be learned here. By deep ploughing and working the ground both before and after the drill, even if putting less ground under crop, I am sure better returns will result. If in times gone by good results were obtained when manures were not used, if the ground were now treated in the same way should we not look for better results? Another big improvement is that of grading seed wheat. If this is done properly, better results must be obtained, as the rubbish and inferior seed is taken out, and only good, plump grain sown, instead of, as in the old way, weeds and all else going back into the soil. The twine binder, I think, ought to be on all farms, as the hay is much cleaner and easier to handle, and the machine saves a lot of labor in raking, and the sheaves can be handled when loose hay cannot. In regard to reaping and cleaning the wheat, in my opinion the stripper is the best machine, worked with the ordinary winnower. We have the harvester, but with it the chaff is lost, and the seed of weeds and drake is blown on the land to grow again and increase. Harvesters seem to become heavier to work as the parts get worn. Men start working them with four horses, and then five, and sometimes six. A motor harvester has not yet been a very great success. Motor winnowers need a good deal of improvements, in my opinion, before they can be managed with success by the average farmer."

Shannon, July 23.

PRESENT.—Messrs. Proctor (chair), W. M., L. B., E. B., and W. M. (jun.) Smith, W. and H. Glover, Cronin, Fleming, Carey, Williams, J. J. Cronin (Hon. Sec.), and 14 visitors.

FALLOWING.—Mr. H. Glover contributed a paper on this subject. Fallowing should be commenced as soon as possible after seeding was finished, he said, as without doubt

early fallow gave the best returns in this district. If necessary, however, he would continue fallowing till October, as late fallow was preferable to having to plough at seeding time. He used the plough, as it turned the soil over and let the sun sweeten it. It was best to cut a furrow of not more than 7in., as this made a clean cut and left no ridges between. It was a mistake to have too much draught on the plough, as it was hard on the horses, and pulled the instrument to pieces when stumps were encountered. It should be set just to keep it in the ground, cut all small bushes, tussocks, &c., and turn the furrow nicely. Three inches was deep enough to fallow in this district, as in most cases clay was met with at that depth, and it did not do to bring that to the surface. If turned on top, the clay held the water a long time in winter, and then baked hard. Fallow should be harrowed down in October, if possible when in a nice moist state. This would break up most of the clods and bunches of tussocks, and make it better for the cultivator to work just before the next seeding. With this treatment the stumps would come to the top, and they should be carted off or burnt before the crop was put in. In discussing the question, Mr. Fleming was of opinion that 3in. was too shallow to plough. He also thought all the draught possible should be put on for fallowing. The Chairman considered it better to fallow deeper than 3in., provided the soil would admit of it.

VEGETABLES.—Mr. W. M. Smith tabled some cabbages and cauliflowers grown on his farm. Some of the cauliflower leaves were over 3ft. high, and the samples were considered to be first-class specimens. Very little manure had been used in their production, but the land had been fallowed to a depth of 12in.

Utera Plains, August 20.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Gale (chair), A. and C. Venny, J. and M. Abrook, R. H. and T. Hornhardt, G. and R. Barber, Chase, Haines, Lee, Naughton, Guidera, Sinclair, Pulford, Brenack, Ramsey (Hon. Sec.), and 10 visitors.

Journal: REVIEW AND DISCUSSION.—Mr. Hill's paper on this subject was read and discussed. It ran as follows:—"It is a duty of the Bureau to discuss papers read at other Branches. Referring to May issue, page 904, I commend Mr. Brennand's paper on 'How to make Bureau Meetings more Attractive' to your consideration. Though it is not always pleasant to be told of our shortcomings, it is well to know them. To make the meetings a success, and to maintain interest, united as well as individual effort is necessary. There is nothing more discouraging to Bureau effectiveness than the irregular, unpunctual, silent, and don't-care sort of member. April issue, 1910, page 794, 'Treatment of Wounds in Live Stock': Mr. Story's paper on that subject should be kept by every farmer. Accidents are continually occurring among live stock, and the impossibility of getting veterinary assistance sometimes forces a farmer to be his own surgeon. The four worst kinds of wounds are dealt with, and he supplies an excellent prescription to treat each kind. 'Care of Horses' Shoulders,' August issue, 1909, page 76: This paper I consider to be a very good one. It is well known that the principal causes of sore shoulders are overwork, overfeeding, and ill-fitting collars. If overworked a horse becomes very heated, and when the collar is removed the sudden change of temperature causes the shoulder to scald. As a remedy for this he advises bathing the shoulders in warm water immediately the collar is removed. To prevent chafing he recommends either a leather false collar or a bran bag. I agree that the use of traction springs on each chain, and shifting the draught on the hanes from time to time, is also a good preventive. December issue, page 456, 'Killing Mallee Shoots': Mr. Cavenagh's method of killing shoots is to plough the ground with plenty of draught on, and pull out the stumps. I fully agree with him that ploughing stumps up is the best method to get rid of the shoots, and for those that are left to be cut in February and March. But after being out in February and March the shoots would not grow in the next six months, as he presupposes, as mallee chiefly grows in the summer. I cannot, however, see how cutting the shoots with the grubber is the best method to kill them. My experience is that with the grubber there is always a portion of the stump chipped off and the next year the shoots grow much thicker and quicker than before. I prefer to use the shoot-cutter, and leave about 6in. of the shoot on the stump so that the branches which are left shoot next time, instead of the stump itself." General discussion followed, in which members agreed with the statements made in the paper.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, August 19.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Hill (chair), Venning, Allengame, Cavanagh, Liersch, T. and A. H. Fidge (acting Hon. Sec.).

ROTATION OF CROPS.—Discussion took place as to the best form of rotation of crops for this district. Mr. T. Fidge was of opinion that it was best to grow two crops of wheat, then one of oats, followed by either barley or rape for fodder. These made good feed and would enrich the soil. Members were divided in opinion as to the best fodder.

Forster, July 23.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. F. Johns (chair), J. and W. Searle, W. E. and H. Towill, W. and J. Johns, C. Payne, R. Copp, J. G. R., and H. Whitfield, C. Hayman, A. Luxon, W. Sears (Hon. Sec.), and five visitors.

MALLEE SHOOT.—A paper on "The Destruction of Mallee Shoots" was read by Mr. R. Whitfield. He thought the most effective and least expensive method was cutting with the ordinary shootcutter. This instrument was better than the slasher, as it cut the shoots close to the stump, whereas the slasher frequently left several inches on the stump. For land under crop the best time to cut was June and July. After that the wheat would be damaged in the operation. On grass land he would leave the shoots until as near to harvest time as possible, so that they would not have grown much by the time the fire was run over in February or March. Treated in this way, shoots should be easily killed in three years. Mr. J. Searle thought it best to cut with the slasher in March and run a fire over. The majority of those present thought this last method the best.

HORSE-BREEDING.—Messrs. J. and W. Searle were of opinion that where feed had to be bought for mares it was best to breed early. Messrs. Johns thought early fillies would probably be stunted. Some of those present thought it best not to work mares at all when in foal.

Forster, August 20.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. J. Searle (chair), W. and H. Towill, J. G. R. and H. Whitfield, W. Searle, Luxon, Purdie, Sears (Hon. Sec.), and one visitor.

POULTRY.—The following paper was read by Mr. J. Whitfield:—"Properly cared for poultry are one of the best paying adjuncts of the farm. I have tried all sorts of pure breeds and have come to the conclusion that the cross breeds are the most profitable, being much harder and healthier. The cross with White and Brown Leghorn and the White Leghorn crossed with the spangled (Silver) Hamburgs are both good layers. If you want heavier birds the Silver-grey Dorkings is a good hard fowl for this district, and they, too, cross well with the above mentioned breeds. I notice in the *Journal of Agriculture* of July that T. E. H., of Butler, asks advice as to which is the best breed to cross with the White Leghorn [to produce a good table bird and at the same time be fair layers.—Ed.]. The reply given by Mr. D. F. Laurie is White Leghorn cock with Black Orpington hens suits very well, but Mr. Laurie prefers pure breeds, and thinks it best to get Wyandottes or Black Orpingtons and keep them pure. This advice coming from the Poultry Expert is, in my opinion, very misleading, especially so to beginners. Surely Mr. Laurie knows that both the Wyandottes and the Orpingtons are a cross breed, viz., a breed procured by the union of different breeds; and it is well known that when we start with cross breeds we soon get to the mongrel. How often we hear complaints from people who have paid fair to high prices for eggs advertised as pure bred, but when the chicks grow up are found to be quite a mixture. For instance, White Leghorns with black feathers, or rose combs, white legs, &c." [Mr. Whitfield seems to have taken a very curious view of Mr. Laurie's recommendations.—Ed.] Mr. W. Towill advised members not to cross White Leghorns with "inferior" breeds. Mr. H. Whitfield believed in keeping well-bred roosters and changing them every year. Mr. J. G. Whitfield would not keep a rooster over two years of age.

LONG HAY AND CHAFF FOR HORSES.—Mr. W. Towill considered it best to give horses about half hay and half chaff. Most members agreed with this plan. Mr. Whitfield thought if hay could be harvested and stacked fairly green, horses would not need short feeds.

Geranium, July 30.

PRESENT.—Messrs. W. Mitchell (chair), M. and T. L. Alford, Blatchford, Gurr, W. J. Mitchell, Goldsworthy Lang, Looney, Paige, W. D. and F. J. Hammond, Pannell (Hon. Sec.), and three visitors.

FALLOWING IN NEW MALLEE COUNTRY.—The Hon. Secretary introduced the subject of fallowing. After some discussion members advised the following procedure in new mallee lands, viz., plough lightly—not over 3in.—and keep the surface as rough and exposed to the sun as possible. The moisture in this new unworked land is inclined to be sour and needs to be dried out rather than conserved for the first season or two. When by this system of loose, open working the land has been somewhat sweetened it is advisable to work deeper and pack the soil more.

Lameroo, June 18.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. F. W. Eime (chair), Leckie, Skinner, Wittwer, Jeffry, Needs, Hauman, Cameron, Messenger, Ross, Sinclair, W. and O. G. Trowbridge, Wray, Shannon, Mead, Walsh, Dunstone, R. R. Eime, Gibbon, Edwards, R. B. and A. J. A. Koch (Hon. Sec.), and two visitors.

WAGONS FOR FARM USE.—Mr. Sinclair read a paper on this subject. Some people liked the English wagon, others the trolley, and others again preferred the German wagon. In his opinion the first-named was the best for farm use. Having a square enclosed top it was suitable for the various kinds of loads that had to be carried about the farm. The top was not so high as to make it difficult for loading, and when loaded a good deal of the weight hung between the wheels, causing less strain and swing of the frame on stumpy and rough roads than was the case with the trolley. There had been a tendency in recent years to build large wide-tired wagons and trolleys so as to be able to carry heavy loads. Where the roads were good and the farm land fairly solid this worked very well, but he considered that for general farm use a wagon was best which could be drawn by two horses for a good many purposes, such as bringing in a load of stumps, taking out seed wheat and super., or bringing a ton of goods from the railway. In this district, in particular, he considered many of the farmers had wagons and trolleys that were far too large and heavy, making it necessary to put on at least four horses for all work. A wagon to carry between 4 tons and 5 tons and to accommodate 50 bags of wheat, which could be taken to the station by six average horses, was most suitable for this district. Mr. Cameron, who had made wagons for many years, had found that the set of the axle and the height of draught had as much to do with the running of the wagons and trolleys as the width of the tires. Table-topped trolleys had many advantages over the ordinary English wagon. Mr. Shannon preferred the trolley, but did not like to have the tires much more than 5in. wide. Other members, however, could not agree with him in regard to the width of tires.

INFERIOR SUPERPHOSPHATE.—The Secretary reported that, having noticed his S.A. super. varied a lot in color this season, he sent a sample to the city for analysis. The result showed that instead of containing from 30 per cent. to 32 per cent. of water-soluble phosphate it only contained 22.5 per cent. Several members signified their intention of adopting the same course as the Hon. Secretary in future.

VEGETABLES.—Mr. Wittwer tabled some Chinese cabbages, of which he had about quarter of an acre growing in white sand dressed with stable manure. He had been feeding pigs and cows on this for a considerable time. The specimens were well grown, about 2ft. high, and had a hot taste similar to cress. The stock named were very fond of it. Mr. W. Trowbridge exhibited a fine bunch of turnips, a sample of a plot grown on his farm.

ANNUAL REPORT.—On July 20th the annual meeting took place, when there were present about 100 visitors. Musical items and refreshments were provided and the Secretary presented his report, which showed that the Branch had done good work. The first field trial held in the district as well as the first agricultural show society were

brought into being by members of this Branch. The Assistant Director of Agriculture delivered a short address, emphasising the need of thorough cultivation of the soil, careful pickling of seed, selection of seed, and judicious manuring. Numerous questions were answered by Mr. Richardson.

Mannum, August 27.

(Average annual rainfall, 11½ in.)

PRESENT.—MESSRS. Faehrmann (chair), Mann, Greenshields, Wilhelm, Lenger, Schulze, Herin, Heidrich, Scott, Berriman, and Schuetze (Hon. Sec.).

ORCHARD PROBLEMS.—Members wished to know (1) The cause of peach buds, especially early kinds, falling off before they burst into bloom, and (2) should orange trees be cut back when being transplanted? [The Horticultural Instructor (Mr. Geo. Quinn) replies—“(1) The actual cause is not known, but immaturity and fungi are suspected at present. Further investigation of this matter is necessary. Present suggestions are to avoid winter pruning and thin out after the fruits set. Sprayings with Bordeaux mixture in autumn—May or June—would be worth a trial. (2) If the roots are bare of soil trim them and reduce the tops also to secure a balance. If trees are small and roots embedded in the soil in which they grew do not trim the tops.”—Ed.]

TAKEALL.—General discussion on takeall took place. Members were of opinion that no certain preventive of the disease had been discovered.

Murray Bridge, July 25.

PRESENT.—MESSRS. McIntosh, J. C. and E. Kuchel, Stecker, Doyle, Patterson, and Davio (Hon. Sec.)

SELECTION OF WHEAT.—The following paper on this subject was read by the Hon. Secretary:—“In wheat-growing the varying conditions of climate and soil determine the choice of varieties, and the first thing the grower has to decide on is the variety or varieties best suited to his locality. This can only be done by actual experiment—trying those wheats which have done best under similar climatic and soil conditions and fixing on those which give satisfactory results. When conducting experiments the grower should not forget that to have exactly similar conditions in two districts is wellnigh impossible. Thus the comparative failure of certain varieties in the first year of trial does not prove their unsuitableness, since after becoming acclimatised the yield from them may be excellent; but if no improvement is shown after the second or third year it is safe to consider the varieties as unsuitable. The fact that certain qualifications are needed will necessarily limit the number of varieties from which one may make a choice. In the first place all varieties that are not good milling wheats, i.e., which do not produce a large percentage of flour of good color and strength, should be discarded unless they have other proved advantages which more than compensate for this weakness. Some varieties also have peculiarities that retard harvesting operations, or tend to considerable loss of grain, either before or during the stripping. Others, again, are very susceptible to disease, and should therefore be excluded from districts where their susceptibility is likely to develop in an active form. In most of the wheat-growing portions of this State rust resistance is absolutely essential. Having decided on the variety or varieties that it is best for him to grow the farmer must go in for a process of selection. This is necessary to counteract the natural tendency of the wheat plant to rapidly degenerate, both in quality and productiveness. The fact that wheats which were grown almost exclusively a few years ago are now practically unknown is due entirely to the failure of growers to recognise this natural characteristic of the family to which the wheat plant belongs. The wheat flowers are fertilised by self-pollination; and it is a well-known fact, proved by botanists, that seed produced by self-pollination is inferior to that produced from cross-pollination, and that the plants grown from such seed are likewise weaker. The production of natural crosses in the case of the wheat plant is very rare, although cases have been noted where wheats have been sown mixed and have ripened simultaneously, with the result that cross-fertilisation has taken place. Single plants may here and there become crossed and produce plants which may be taken advantage of for the formation of new varieties by a process of selection tending to fix any desirable properties in the progeny of the plant. Variations in a variety often occur, and are known as ‘sports.’ These also may be used for producing new varieties if they possess qualifications that

will justify their cultivation. The method of selection by which old wheats are improved and new varieties fixed in type is as follows:—The first seed is obtained by going through a crop and picking the best heads—heads which are perfectly true to type. These are threshed and the seed graded (a necessary practice with all seed wheat). They are then sown by hand in small plots, each grain being dibbled in 6in. apart in rows about 1ft. apart. At harvest time the best heads from these hand plots are taken to provide seed for the next year's hand plots. The remainder of the heads are stripped and the seed resulting is used to drill in a small plot, the product from which will be sufficient the year following to sow a fairly large area. The seed produced from the first hand plots is what is known as first selection wheat. The seed produced in the same way from the hand plot of the second year is second selection wheat. The third selection will be the product of the third year's hand plots grown from the best seed produced in the second hand plots. And so the experimentalist goes on producing seed from the best grains grown each year, and as he proceeds with his selection the seed wheat resulting becomes better each year, with a corresponding improvement in the general product. It is not only necessary to use none but the best heads in making a selection—the very best grains should be chosen; hence the importance of grading all seed wheat. A small undeveloped seed cannot reasonably be expected to produce a strong healthy plant, and the same applies to broken grains, some of which will germinate if sown, with the result that weak, sickly plants are produced. Another important consideration to be urged in favor of grading the seed is that the grower gets practically a pure sample, and a pure sample will tend to keep his land clean and save him immense trouble and expense, both at harvest time and when working the land. Selection itself gives one the advantage of being able to keep his seed clean, while grading benefits chiefly in that it enables the best grain to be separated from inferior seed. Another advantage of grading as an adjunct to selection is that by always using the very best developed grains the hardness of the variety is increased, and heads not affected in years when certain diseases are prevalent help towards the production of a strain which, in time, should be almost immune. A method of producing disease-resistant strains on these lines has been tried with marked success. The procedure adopted is to inoculate the seed with the disease which it is desired to make it resist, and by a process of selection form a strain originating from those plants that are not affected. The seed is inoculated afresh each year. All the weaker plants succumb, and only the strongest survive, and from these seed is taken for the next year's crop. Thus the grower has at length a resistant strain of the variety he started with. By the same method of selection varieties may be made more drought-resistant or more suited to wetter conditions if so required. The result of all this is to make possible the opening up of large areas of country at present useless in so far as wheat-growing is concerned. The fact that, all other things being equal as regards climate and soil, selected grain will give increased yields ought to recommend the practice to farmers. If wheatgrowers were free from the danger of loss to which different diseases subject them it would mean a very considerable increase in their returns. I think you will see that it is greatly to the advantage of farmers to take up this subject, and I believe it would be a profitable undertaking on any well-established farm." An animated discussion followed, in which the main features of the paper were agreed with. Federation was voted the safest wheat for the district. The practice of bringing wheats from a drier district when making a change of seed, which was almost unanimously advocated at the Conference of the Upper Northern Branches, was, in the opinion of all present, almost invariably a failure in this district, members only getting good results from seed brought from a wetter locality. Mr. Doyle cited similar experiences in the South-East.

Parrakie, August 19.

PRESENT.—Messrs. Hayman (chair), Dayman, O., C., and H. Heinzees, C. Morrison, Bastian, Leoor, Deiner, Schmidt, Beelitz, Sowerby, Willis, Gravestock, Burton (Hon. Sec.), and two visitors.

FRUIT FOR FARMERS.—Mr. Deiner read a paper to the following effect:—Every farm should have a few fruit trees. They improved the property and soon paid for the cost and trouble of planting. A good sandy loam about 2ft. deep, with a clay subsoil, was suitable for most fruits. The ground should be grubbed clear of all stumps and undergrowth, and ploughed up fairly deeply. The holes should be about 12ft. apart each way, 3ft. square, and about 4ft. deep. With 12ft. between them the soil could be ploughed both ways. Having left the holes open to admit sun and air for several days, stable manure should be mixed with the earth and the planting commenced. The roots should

be spread out in all directions, and the covering earth well tramped down. In dry weather trees should be occasionally watered. Only good trees should be planted. Rome Beauty and Cleopatra were the best apples. Bartlett or Duchess was the best pear he knew of. Gansell's Bergamot was a good variety, but not a heavy cropper. He would recommend Elberta peach, River's Early Prolific and Pond's Seedling plum, and Moorpark and Royal apricots. They should be well pruned before planting, and each succeeding year, cutting away as much old timber as possible. A good breakwind should be planted round the garden, and for this purpose sugar gums or olives would be found best. Tagosaste or tree lucerne also made a good breakwind, but he had found it rather difficult to get established. Olives were the hardest trees of all, and they grew from cuttings. Members thought it was a good plan to plant fruit trees, although one member present saw little progress in trees planted two years ago.

POULTRY.—The Hon. Secretary read extracts from a paper on poultry-keeping which is printed on page 119 of the July issue. Members agreed that properly-cared-for poultry paid, but they thought fowls should be kept away from haystacks.

Renmark, July 25.

PRESENT.—Messrs. Waters (chair), Nuthall, Smith, Taylor, Geneste, Braund, Wilkinson, Dix, Basey, Howie, Huggins, and Cole (Hon. Sec.).

PROTECTION FROM CODLIN MOTH.—The Hon. Secretary initiated a discussion on the prohibition of the importation of fruits into Renmark, in order to keep out the codlin moth, which, up to the present, had not appeared there. Members were of the opinion that the present system of fruit inspection was inadequate. The fruit inspector being three miles from the town it was almost impossible for him to carry out his duties. It was thought it would be wise to combine the duties of fruit and phyloxera inspection. The Hon. Secretary suggested that a tax should be levied on the apple and pear growers to provide the necessary money to carry out the work thoroughly. Members were of the opinion that the inspector should reside in the town.

ANNUAL REPORT.—The Hon. Secretary reported that four meetings had been held during the year, with an average attendance of nine and a half members. The following subjects had been discussed, viz.:—"Black Spot on Vines," "Concrete Fence Posts," "Smudge Fires for Frost," "Export of Pears," "Pruning Pear Trees," "Orange Brown Scale," "Fumigation of Citrus Trees," "Oidium on Vines." An effort was also made to secure the prohibition of fruit and vegetables from the settlement to keep out the codlin moth, and a petition was presented to the Hon. Minister of Agriculture for this purpose.

Renmark, August 22.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. Smith (chair), Waters, Howie, Basey, Pike, Geneste, Taylor, Braund, Weste, Pitt, Dix, Huggins, Wilkinson, Nuthall, Cole (Hon. Sec.), and two visitors.

WHAT TO PRODUCE ON THE MURRAY.—Mr. E. Pitt delivered the following address:—"I wish to point out in the first place that the market for dried fruits in Australia is limited, and that there is very little prospect of securing markets elsewhere. It is only a question of time when fruit-growing will be overdone on the Murray, but it would not be fair on this account to suggest that the development of the river country should be arrested. Rather should we look around for other lines of production which may be profitably exploited. No one has yet realised the possibilities of a developed Murray. The area suitable for fruit production may be limited, but there are vast areas suitable for other industries. Nearly all the land yet to be developed is held by the Crown, and therefore it is reasonable to expect the Government to do the experimental work, instead of leaving it to private persons to do, as was the case of Renmark. Of fresh fruits, the apple is one for which there is an unlimited market, and of which certain varieties might be cultivated with profit on the Murray. Messrs. Basey & Howie have shown that the pear can be exported with profit from Renmark, and the pear does well on the river. Persimmons and passion fruit have been mentioned, but I am under the impression that the market for these products is not very large. Under present conditions dairying offers, perhaps, the largest scope for development, but the establishment of factories, creameries, or refrigerators on a large scale would be necessary, and this could very well be undertaken by the Government. Dairying has been called a 'White Slave' industry, but I believe that with up-to-date plants a good living can be made off 40 acres of irrigated

land. My first occupation in South Australia was on a dairy farm near Adelaide, where 100 cows were kept on 130 acres, for which a rent of £5 per acre was paid. Lucerne was grown on 100 acres, and winter crops on the remaining 30 acres. Here on the river we could grow twice as much lucerne as we could near Adelaide, and I think we could safely reckon on carrying two cows to the acre. A man with 40 acres might put 20 acres under lucerne and keep the balance for fruit, vegetables and winter fodder. But it will be necessary to have some back country to work in with the irrigated land for stock-raising. If this was provided a clear income of £1 per day from 40 acres ought to be certain. There is a big scope, also, for pigs. I knew some men a few years ago at the Finniss, who were making £700 a year on 50 acres out of pigs alone. These men had a system of small paddocks. The brood sows ran in a patch of, say, two acres of lucerne, provided with water troughs. As the young pigs were weaned they were turned into small patches of peas or corn. There are great possibilities in corn on the river. One thing I learned whilst in America was the extent to which crops were valued there on their feeding properties. Most of the crops went to the hogs or other stock, and was sold on the hoof. A great deal can also be done with poultry. With cold storage there should be a great market for dressed birds, as inferior roosters of four or five months old are selling to-day at from 2s. 6d. to 3s. each. A man with 20 acres who went in for poultry properly would not need to worry about fruit-growing, but ought to be able to make £300 a year. Poultry, pig-raising, and dairying should be run in conjunction with each other. There is a lot to be said, also, in the fattening of sheep and lambs on lucerne and grass fodders. It has been reported that as many as 70 sheep to the acre have been carried on lucerne, cut and fed, and not grazed. I estimate the carrying capacity of the river districts with irrigation at 20 sheep per acre. It is possible to fatten store sheep in six or eight weeks, thus fattening, say, five lots during the year, making 100 sheep to the acre per annum. This should give a profit of 3s. per head for fattening, and shows £15 per acre gross return. In the case of lamb-raising, the same number of ewes, viz., 20, should rear a lamb each, which would realise 12s. per head, and the ewe's fleece 5s., thus showing £17 per acre return. Two men can easily manage 40 acres, or three men 100 acres. I estimate the expenditure thus—Water rate and taxes, 30s. per acre, or £60 for 40 acres; interest on the capital, £7 per acre; for improved land, £280 at 6 per cent., £16 15s.; wages for two men, £220 per year. The 40 acres of lucerne carrying 20 sheep per acre shows a gross profit of 15s. per head, leaving a net profit of £303 5s. Larger areas give correspondingly larger profits. These figures are worked out at the lowest estimate. Horse-breeding also offers great possibilities, and was never so profitable as now. A man might work his farm with 10 mares, at a cost of £30 each, at a total outlay of £300. After the third year, with a fair percentage, he should have at least eight young horses to dispose of. These at present prices should easily return him £30 each, making £240 per year, besides the use of the mares for farming purposes. For all these industries it is essential to have some back country for dry farming in conjunction with the irrigated land: it is also necessary to get the Government to start an experimental farm at the earliest possible moment, and to do so on a sufficiently large scale to thoroughly test all likely industries. As regards the relative cost of preparing the land for fodder crops and fruit, I will put the clearing at, say, £3 an acre: ploughing and grading at £2 10s. These sums would hold good for both fruit and fodders, but beyond that lucerne would cost about 10s. an acre, as against £35 to £60 an acre for currants or Sultanas, according to whether a man did the work himself or paid for it to be done. Other industries which might be considered are flax, cotton, corn, and rubber, &c." Discussion followed. Mr. Waters said regarding lucerne that several other fodders were well worthy of notice. He found that lucerne after several years' growth was liable to get sick. Mr. Pitt agreed that there were other grasses better for winter feed. Barley, when planted in February, made an excellent winter feed, as much as three cuts being possible in one season. With reference to the apple, Mr. Pitt remarked that although we can grow the apple very well here, he found that it lacked the rich color that was obtained in colder districts. Mr. Taylor disagreed with Mr. Taylor on this point, and mentioned that he had seen as good a colored apple here as anywhere in the State.

Sherlock, July 23.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Osborn (chair), Whyatt, Nicksch, Alwege, Coombe (Hon. Sec.), and four visitors.

VALUE OF THE AGRICULTURAL BUREAU.—In his annual report the Hon. Secretary made the following suggestions for the improvement of the work of this Branch. A

definite programme of work should be arranged at least three months ahead. Each member should be responsible to introduce some suitable subject for discussion during the year. The report continued—"It is surprising that more interest is not manifested in Bureau work. It is of vital importance to all farmers to keep in touch with modern agricultural science, and in this State it is through the medium of the Bureau and the *Agricultural Journal* that this knowledge can be obtained. New ideas are breaking down old fallacies, and these should be discussed at our meetings, and the opinion of each member given." Seven meetings were held during the year, with an average attendance of just over seven members.

Sutherlands, August 20.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Snell (chair), Mibus, Doecke, Broadbent, Dohnt, Naock, Geyer, Thiele, E. and A. M. Twartz (Hon. Sec.).

MALLEE FIREWOOD.—Mr. Dohnt said the red mallee was the best, being hard and making a good fire. The white mallee was light, and burned very quickly. Mallee now commanded as much as 11s. 9d. per ton at the railway. Members thought mallee should be cut into lengths of not more than 5ft. 6in., and that roots should be not more than 5in. square.

SELLING BAGS AS WHEAT.—The paper on this subject, which is printed on page 73 of August issue, was read and discussed. Members could not agree with the views therein expressed. They considered that any attempt to make purchasers of wheat pay for bags would only complicate matters, and the difference in money would come off the price offered for the wheat.

STANDARD CORNSACKS.—It was reported that many farmers who were originally opposed to the standard sack were now alive to its advantages and quite converted to its use.

EXAMINATION OF STALLIONS.—Members were of opinion that all travelling stallions should be examined and licensed.

Wilkawatt, August 20.

PRESENT.—Messrs. W. J. Bowman (chair), D. Bowman, C. and T. Sorrell, Gregurke, H. and E. Brooker, J. and J. Altus, Arhns, O'Shea, Harvey (Hon. Sec.), and two visitors.

FALLOWING.—The following paper on fallowing in this district was read by Mr. Gregurke:—"A farmer who intends to fallow should commence as soon as possible after seeding operations are over; July and August are the two best months for it. The depth may vary according to the nature of the soil, but, generally speaking, in this district broombush land may be fallowed 4in. and the clay flats 5in. deep. To plough deeply here is only to turn the best soil down and bring up the cold soil. It also means extra work for the horses. An 8in. furrow is a good width to plough, and it is important that the furrow should be properly turned to bury weeds and rubbish, which all go to make manure. Fallowing should be finished by the middle of September, and it should be harrowed as soon as possible to level it before the soil sets hard. I prefer to plough in lands from two to three chains wide. At the next ploughing it should be turned back again, as the soil should not be worked the same way year after year. Every man should try to plough as straight as possible—crooked ploughing causes a lot of bother at the finish. One should not cultivate fallow more than 3in. deep, as it only turns up the bottom soil again. It should be cultivated during the spring to kill the weeds, and, if possible, after all summer rains the surface should be loosened to help retain the moisture. Mould boards should be kept greased when not in use as a shiny board turns the soil much better than a rusty one, and the pulling is much easier." Discussion followed. Members were of opinion that 5in. was the best depth to fallow in this district.

EXAMINATION OF STALLIONS.—The Hon. Secretary read a paper on this subject from *July Journal*, page 1096. Members were thoroughly in accord with the views expressed therein by Mr. Hill. They thought some measure should be passed which would prevent the sale of unsound stallions, and that no stallion should be permitted to travel for hire without a certificate of soundness from a veterinary officer of this State.

RAINFALL.—The Hon. Secretary showed an interesting table giving the rainfall for each month of the past two and a half years. The totals were—1908, 16.68in.; 1909, 17.96in., and for seven months ended July 31st, 1910, 9.98in.

SOUTH AND HILLS DISTRICT.

Forest Range, August 18.

(Average annual rainfall, 36in.)

PRESENT.—**Messrs.** Pollard (chair), A., E., and H. Green, Rowley, Monks, (Hon. Sec.), and one visitor.

HOES—LONG v. SHORT HANDLES.—The following paper, written by Mr. R. Green, was read by the Hon. Secretary:—"It is very curious, notwithstanding the fact that some people are so progressive in some things, how backward and conservative these same people are in other matters. This applies more to people engaged in rural pursuits than to those that are in the manufacturing industries, and I think also more to horticulturists than to agriculturists. Perhaps this may be accounted for by the fact that the latter have a wider scope for their abilities, take a greater interest in exhibitions of all kinds, and last, but not least, have to consider every possible means of saving labor in connection with their avocations. Of course, as far as the orchardist is concerned, particularly in our hills country, it is not possible to utilise to any great extent labor-saving machinery, and we therefore are compelled to still use implements and tools that our forefathers used before us, with possibly slight variations. Perhaps the garden hoe is more in use than any other implement in the gardening industry. Evidently in our great-grandfathers' time it was the fashion to make the work of hoeing as hard and laborious as possible, judging from the shortness of the handles used. So impressed did some of their descendants become with this short-handle system, that they are continuing to use it, with the result that they have to bend nearly double to accomplish any work at all. A handle for any hoe should never be shorter than will permit the user to stand perfectly upright on level ground to work comfortably, for it is well known that anyone can do more work, and do it more comfortably, standing on his hind legs than attempting to work on all fours. I make handles for my own use about 4ft. long, and that, in my case, just allows working in an upright posture. The easiest and most comfortable hoe I ever used is one with a handle 6ft. long. I have used it all day long, at times, and have been astonished that, notwithstanding I have worked fairly hard, my arms did not ache half as much as when I used the shorter one. Of course, amongst raspberry canes or currant bushes such a length of handle as this could not be used, as the end would get entangled amongst the branches, but anywhere else the longer handle is the easier one to use every time. In the old days when hay was all cut with the scythe (I am alluding to the English-made handle, when the blades were not set as was the case afterwards), and in order to mow the crop a person had to bend nearly double, what hard, back-aching work it was to continue all day long with these nearly straight handles, but when the Yankee scythe handles came into operation and made it possible to set the blade so that the mower could stand upright, what a difference it made in the ease of the work, the extra amount done during the day, the cleanness of the cut, and saving of energy. The remarks made regarding the 6-ft. handle apply principally to the flat, or chopping hoe, and not so much to the prong hoe, because the former is used more particularly for skim-hoeing, and the latter for deeper cultivation. But when the prong hoe is used for skim-hoeing, as it can be admirably when the soil is fairly clean and friable, then the longer handle will be found to be a great improvement even upon the one that will simply allow the worker to stand upright. Pretty much the same thing holds good in connection with other tools. We frequently use a short-handled spade or shovel, when it would be easier and more comfortable to have long-handled ones. Labor-saving devices and facilities for carrying on industries are the order of the day. Why should the gardener not also study as far as possible the easiest, most convenient, and comfortable mode of prosecuting his occupation?" In the discussion which followed Mr. H. Green said he never used a long-handled hoe; about 3ft. he thought was the length. Any longer than this he was afraid would stick in his clothes. He liked to be close to his work, and did not think anyone could use a long-handled shovel or spade as well as a short one. Mr. A. Green used a short-handled hoe. He had never tried a long one, but thought the closer a horse got to its work the easier it was. The Chairman once tried a hoe with a handle about 4ft. 6in. long, but it was awkward. He considered 3ft. 6in. a handy length. A short-handled miner's shovel was splendid for throwing earth out of a hole. Mr. F. Rowley did not think you could make hoeing easy by having a long handle. He did not like a long-handled shovel. Mr. E. Green liked handles about 3ft. 6in. long. He thought it would be interesting to conduct a test to know whether more work could be done with the long than the short handle.

Gumeracha, August 22.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Porter (chair), Woolard, Moore, Randell, Monfries, and Lee (Hon. Sec.).

CO-OPERATION AMONG FRUITGROWERS.—The Chairman read the following paper on this subject:—"When the man on the land wants to buy anything he has to buy at the seller's price, but when he has something to sell he has to take what is offered, and in numbers of cases that is a price which will not do more than pay the cost of production. I am sure that by combined effort the fruitgrowers could alter their present condition. Take, for instance, plums. When, as was the case last season, we have a very heavy crop the supply is more than the demand, and as the competition among buyers is limited prices naturally fall too low for the producer to make a reasonable profit. It has often been said that a jam factory is needed in this district. I think the best way to establish a factory is by co-operation among the growers within a radius of, say, 10 miles. Either erect a factory or get someone who has a suitable building to do the work of jam-making, preserving, or pulping, as the case may be, each man paying his share of expenses and receiving all profits of his fruit when sold. A number of growers combining as suggested could hold the produce of an abundant season over till there is a shortage, and so secure a better return all round. To ensure the success of a thing of this nature all interested must be able to resist the temptation of selling outside when the market is good. With export apples the same thing might be done, having all the packing done at one place. It would take less hands, and the grading should be more uniform. The profits of the packers would be saved to the growers, and by buying large quantities of boxes, paper, woodwool, &c., a considerable saving might be effected." In the discussion which followed considerable difference of opinion existed. Some were flatly against the proposal, but the majority were in favor of the co-operative principle if it could be carried out. To do this, it was absolutely necessary that shareholders should send all their fruit to their own factory. It was stated that the cost of carting sugar from the city and the competition of opposing old-established firms would be the chief difficulties. It was thought by some that although the money now paid to the packers might, by co-operation, be kept in the pockets of the growers the packers earned all they got.

Hartley, August 12.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Wundersitz (chair), W. and C. Brook, G. and T. Phillips, Tydeman, Hudd, Pratt, Paech, Clark, Symonds, Stanton, Birmingham (Hon. Sec.), and 10 visitors.

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. Hudd, who together with Mrs. Hudd entertained members throughout the afternoon and evening. In the afternoon the property was inspected. One hundred and seventy acres of crop on fallowed land looked well; 18 acres were planted with almonds, and these were getting on well. The garden was planted with roses and ornamental shrubs, and looked splendid. In the evening Mr. Whiting delivered an address on co-operation. A social hour with music, elocution, &c., and refreshments terminated a meeting which was calculated to considerably stimulate interest in the Branch.

Kingscote, August 1.

(Average annual rainfall, 18½in.)

PRESENT.—Messrs. Turner (chair), Bell, Wright, Jacka, Ewens, Wallace, Cook (Hon. Sec.), and two visitors.

CITRONS.—Mr. Wright tabled a citron grown on his farm. It measured 16in. in circumference, and was one of three produced by a tree not quite three years old.

SEAWEED MANURE.—Considerable discussion took place on the value of kelp as manure. The Chairman had applied it to a portion of his crop, and that part was quite 6in. higher than the remainder. Mr. Bell had used it—making it by burning the common seaweed—and the crop undoubtedly benefited.

SEASON'S PROSPECTS.—It was stated that a crop of Huguenot wheat in the back country was looking splendid, and a good return was expected. All the crops on the high land were looking well.

Longwood, August 20.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes (chair), J. and W. Nicholls, Roebuck, Glyde, Doley, Furniss, Oinn, Coles (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—This meeting was held at the homestead of the Chairman.

EFFECT OF CULTIVATION.—During the inspection of the property it was seen that some three-year-old wattles in cultivated land showed three times as much growth as those in uncultivated soil.

STORING APPLES.—It was said that banana cases, holding 2bush., were very good for storing apples. They were fairly open in construction and allowed good ventilation.

BLACK SPOT ON APPLES.—This trouble was reported to be had this year on late picked fruits. Those which were picked earlier and stored were not so badly affected.

Meadows, August 15.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. G. Ellis (chair), Griggs, Brooks, A. Ellis, Morris, Catt, Russell, Nicolle, Smith, Kleeman, Nottlage, and Bertram (Hon. Sec.).

BUDDING AND GRAFTING.—A paper on this subject was read by Mr. Griggs. He said it was very difficult in purchasing buds or grafts to get them true to name. He had bought six trees said to be Newtown Pippins, but when they came to bear they proved to be London Pippins. He had never found Jonathan to fail to bear good fruit on any stock, but Dunn's Seedling on Quarrenden was a failure. It was best to graft on to a stock of a similar color, if possible, and he had the best results by putting the graft on to a small limb about the same size. To graft on large limbs, put the grafts in the bark about 2in. apart all round, countersinking the cut in the bark. The graft can be cut to fit in the bark quite tightly. Hot salve or grafting wax on a strip of rag should then be put round the joint with cow dung and clay on the top. Any bare limbs must be covered from the sun's rays. Budding could be done when grafting was impracticable. Buds could be carried many miles in water. Buds should be put on wood grown the same season, and when the bark could be moved easily; the work might go on for three or four months. He generally used strips of waxed rag taken from grafts for binding.

Morphett Vale, July 19.

(Average annual rainfall, 22½in.)

PRESENT.—Messrs. A. C. Pocock (chair), R. Pocock, Sprigg, Christie, Perry, Rosenberg, Hunt, McCloud, Booth, and two visitors.

FALLOWING.—Mr. Hunt read a paper on this subject. It was necessary in this district, he said, to fallow the major portion of the land intended for crop to enable the farmer to get the seed in at the proper time. Fallowing should commence as soon as possible after seeding and be completed by the end of August. Four to five inches was deep enough for this district. The first opportunity should be taken to harrow the fallow both ways after a light rain. This tended to conserve moisture and left the soil in good condition for further working. The more the fallow was worked before harvest time the better, but it should not be worked in summer. If weeds had to be killed in the hot months a small flock of sheep was better than an implement. Sheep, however, should not be on the fallow when it was wet, as they trod it down too hard. It paid to work the fallow again in the autumn. Before seeding it was necessary to give a deep scarifying and a light harrowing to form a good seed bed. When seeding the grain would then be easily covered.

BURGUNDY MIXTURE.—The Hon. Secretary wished to know whether Burgundy mixture (copper and soda) was as effective for fruit trees as Bordeaux mixture (copper and lime), as it was much easier to obtain soda than fresh lime in some places. [As far as we know, from the use of Burgundy mixture up to the present, it is just as effective as the Bordeaux.—ED.]

BUTTER STICKING TO PRESS.—The Hon. Secretary asked how to prevent butter from sticking to the press. [The Dairy Expert replies—"Boil the press in soda and water and

soak in cold brine for a couple of hours. When using the press, first scald the woodwork with soda and water, and thoroughly cool it down with brine. This should prevent sticking unless the wood is furled up. If the latter is the case, carefully sandpaper all the wood which comes into contact with the butter."—*En.*]

Mount Pleasant, August 20.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Giles (chair), Royal, Tapscott, and Maxwell (Hon. Sec.).

WHEAT AT MARCH SHOW.—After reading over conditions of this competition members expressed themselves as satisfied with them, excepting that they considered the area, viz., 10 acres, might well be omitted, and the prize awarded to the best sample, irrespective of quantity grown.

SEASON'S PROSPECTS.—Owing to heavy rain, viz., 4.0lin. in May, 4.13in. in June, and 5.32in. in July, the crops were very backward and present prospects not good. Stock were in much better condition, however, than was usual at this time of year. Rain-fall for seven months ended July 31st, 18in. 53 points.

Port Elliot, August 20.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. H. B. Welch (chair), Chibnall, Green, sen., Brown, H. Welch, Pannell, W. E. and W. W. Hargreaves (Hon. Sec.).

WHEAT EXHIBIT AT SHOW.—Members agreed in every detail with the reasons set forth by the Saddleworth Branch to account for lack of interest in this exhibit. (See page 82 of August issue.)

BREEDS OF MILCH COWS.—The following information in compressed form was supplied by Mr. Brown:—Jersey cows average about 500galls. milk per annum, with over 5 per cent. of butter fat. They do not stand cold weather so well as some other breeds. Ayrshires average 600galls. milk per annum, with slightly under 5 per cent. butter fat. These two breeds are purely dairy cattle, and of little use to the butcher. Holstein cows average about 600galls. of good milk per annum. They are a large-framed cattle. Normandy, another large-framed animal, averages about 650galls. per annum, with about 5 per cent. of butter fat. This is in a very mild and moist climate. Norfolk Polls give less milk, but stay in a long time. They make good beef, excepting the rib, which is very poor. Angus Polls are practically beef cattle. The large-framed Dutch cattle in their native surroundings give the heaviest yield of milk of all breeds. The percentage of butter fat is about 4.5. This breed crossed with the native cattle of Great Britain produced the Shorthorn, which was then inbred until a fixed type was obtained. The Shorthorn in the north of England and parts of Scotland averages about 650galls. per annum, with 4.5 per cent. of butter fat. This breed, I consider, the most perfect framed cattle in existence. They are docile and very hardy, adapting themselves to any ordinary climate, and are the best cows for general purposes for the average farmer.

Uraidla and Summertown, August 1.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. Collins (chair), Kessell, T. and P. C. Day, Richardson, H. and G. Johnson, Prentice, Hart, Hawke, Cobbedick, Moulds, Curles, Snell (Hon. Sec.), and one visitor.

STRAWBERRY CULTURE.—A paper on this subject was read by Mr. Dyer. The best situation for strawberries was a slope facing the east. He liked red loamy soil over light shale. Two years ago he planted strawberries in this class of soil. He first ploughed it to a depth of 8in. or 9in., worked it well with a horse hoe, and then put bonedust along the rows where the plants were to be and raked it in thoroughly. The plants were put a foot apart with 2ft. 6in. between the rows. This left plenty of room to keep down all weeds—one of the conditions of success. Margarets and Royal Sovereigns were put in. The former, though usually good croppers, were a failure last year. The latter produced splendid fruit, which always brought a higher price than Margarets. The Royal

Sovereigns, however, were not much good after two or three years. Sensations bore well, producing a nice firm fruit, although rather dark in color. It had been said by some of the older growers that new stock should be imported, as most of the local varieties had been grown in the district for many years. He was not opposed to this view. White strawberries used to yield well in his garden, but now they would not bear at all. In regard to diseases, mildew, if it attacked the plants, made havoc of the crop, and the little white grub which attacked the roots was a troublesome pest. Some means of combating this was sadly needed. In the discussion which followed, Mr. Prentice said he had known of instances in which strawberries planted in beds like violet beds had done very well without cultivation. Mr. Hawke considered the strawberry grub did more damage than any other pest. Regarding the depth to plough, while on new land it might be unnecessary to plough deeply, old land should be trenched. Strawberries needed a ton of manure to the acre. Mr. T. Day had heard of applications of ammonia being used to destroy grubs. Mr. Kessell thought the amount of ammonia necessary to kill the grub would also kill the plants. Further information on this subject was desired. [The Horticultural Instructor (Mr. Geo. Quinn) replies—"I can find no record of successful treatment of the grubs. Dressings of lime separately, or of superphosphate and sulphate of ammonia in combination, could be tried, as they would benefit the plants. Sulphate of ammonia must not be used in large quantities, but in the course of several dressings a good lot could be applied if its influence is noticed to be detrimental to the grubs.—Ed.] "

NITROGENOUS MANURES.—Discussing the best way in which to apply sulphate of ammonia in the winter months members were of opinion that it should be applied in liquid form. It was very little use spreading the fertiliser over the surface of the soil, unless shortly before rain.

BLACKBERRY NUISANCE.—Members wished to know the best way to eradicate blackberry bushes. [Will some of our readers give the benefit of their experience.—Ed.]

Woodside, August 24.

(Average annual rainfall, 31in.)

PRESENT.—Messrs. Fowler (chair), Moore, Rollbusch, King, Knuckey, Spoehr, Drummond, Newman, Attenborough, J. D. and A. D. Johnston, Kleinschmidt, Keen, Hughes (Hon. Sec.), and several visitors.

THE BOY ON THE FARM.—The following paper on this subject, written by Mr. R. P. Keddie, was read and discussed:—"There is plenty of light work to be done on the farm to keep a boy employed. Even if he only gathered up the surplus manure round the homestead and in the paddocks the saving would go a long way toward his wages. In a number of cases that have come under my notice the boy on the farm is badly treated. Oft times he has to take the place of a man, and the work being too heavy he gets disgusted with farm work. I notice the boys from some of the farms in this district delivering eggs and butter in the township after 8 o'clock in the evening. When you consider that at 5 a.m., and in some cases earlier than that, the boy has to be at work it is too much to ask him to be on his legs till after 8 o'clock at night. Especially is it so with an active boy, for even if not at work he is on the move from the time of rising till going to bed. I grant there are boys that are not adapted to farm work, but when a farmer has a suitable one he should treat him fairly and not expect too much from him. Farmers who only employ their own family should encourage them by allowing the daughters a percentage on the butter and eggs, and the sons on the profit from the farm in addition to wages paid. The farmer who would do this would find it a very good stimulant to increase production. Treating the boy with kindness and consideration is not only a duty but imparts that spirit of kindness which the boy when grown up will not soon forget and be encouraged to treat others in the same spirit. The present system of engaging boys on farms is not one to be commended. A better system would be that they should be apprenticed similarly to those who are learning a trade. Unfair treatment of the boy on the farm I believe to be one if not the chief cause of so many drifting cityward. This is a fact to be deplored, especially in a young State such as South Australia, where there are such large tracts of land to be taken up and developed. Taken from a financial point of view the young man on the land stands a better chance of success than the man in the city." The paper was well discussed by members, the general opinion being that things had much improved since the time when Mr. Keddie was a boy on a farm. They did not know of a case in which the boy went to work so early or was kept at it so late.

SOUTH-EAST DISTRICT.

Kalangadoo, August 13.

PRESENT.—Messrs. D. W. Tucker (chair), S. Tucker, Morris, Hunt, J. and R. Boyce, Osborne, Earle, Mitchell, Kennedy, Bennett, McDonald, Davies, and Sudholz (Hon. Sec.).

POULTRY.—The following paper on "Poultry-keeping" was read by Mr. Osborne:—"For seven years I have raised pure breeds of poultry, and in that time have gained considerable knowledge, but find I still have a mighty lot to learn. I would advise everyone to keep pure breeds, and in starting poultry-breeding to choose one breed and stick to it. I do not favor incubators in the South-East. They take a lot of time and constant attention. When once you start a batch of eggs you must almost sleep with the machine for the three weeks, and then your trouble just begins. You must have a brooder; the chicks must have care, and proper feed at the very least four times a day. They want plenty of sunshine and no rain. To get good early chicks one must hatch in September and October, and in this part we get a lot of rough weather in these months. One would have to cover the chicks during showers, for if they get wet and cold they will die. I therefore think you cannot beat the broody hen for this district. Pullets hatched in September and October will start laying in March and April, when eggs bring a high price, and with proper feed they will continue to lay right through the winter. Cockerels will then be ready for the Easter market, and will bring high prices. White Leghorns are recognised as the best layers, but if this breed is kept another breed must also be kept to do the hatching, as Leghorns are no sitters, and they also are very poor table birds. I therefore think the Wyandotte and Orpingtons are easily the best birds for the farm. They are good sitters, good winter layers, and a very good table bird. They cannot fly any height, and are easily kept. If, however, you have room and time to look after two breeds properly, then by all means go for White Leghorns also. If the fowls have a free run, which I think is best, they are easily fed. In the morning they should have a mash of pollard and bran, mixed with skim milk or boiled scraps from the house. Twice a week I mix the mash with boiled rabbit soup and a little of the meat. I find rabbit better than any other meat. This, in my opinion, is the best egg-producing mash you can give. Good, clean wheat is fed at night, and in the summer, when there is no grass or green herbage, they should be given a cabbage or kale head to pick at. Above all, supply clean water to drink. An oil drum split down the centre makes a good water trough, and is easily kept clean. The cockerels should be penned up and given plenty to eat. You cannot overfeed them. They should be sent to market at four to five months old, and will then bring about 3s. per head for heavy breeds. If they are allowed to run with the pullets they will not fatten. Houses should be of iron, with as little wood in them as possible. The front should be open and face the east. The floor should be raised about 6in. above ground, level, made with earth or gravel so that it will always be dry. The perches should be about 18in. from the ground, and all on same level. A good warm house is very necessary in the winter, as it then takes less food to keep the birds warm, and more eggs are laid. Laying hens want plenty of shelter, both in summer and winter. Nothing will check the egg supply more quickly than a bleak wind. Every farmer should join the egg circle, and help to keep the price up."

POTATOES.—The Chairman tabled samples of Blue Prolific potatoes. This was said to be a heavy yielder and suitable for the South-East.

COCKATOOS.—In reply to a question, Mr. Earle recommended the following poison for cockatoos:—Powdered strychnine boiled in water, sugar and wheat, and a little pollard added, and the whole thoroughly mixed.

Kybybolite, July 21.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), Lacey, Fanow, Smith, Cooper, Duffield, G. H., W., and C. Hahn, Pettit, Scholz, Kühne (acting Sec.), and five visitors.

POULTRY.—The following paper on "Poultry" was read by Mr. Kühne:—"Poultry and egg production are probably given less attention than any other branch of agriculture by the South Australian farmers. This fact is hard to account for, as, in many instances, the thrifty housewife is expected to conduct the household finances with what she makes out of the poultry and cows. Fowls need not necessarily be treated as rubbish destructors to be fed on garbage that is past using for any other class of stock, or allowed

to forage for themselves when the annual supply of screenings is exhausted. In cases where the wheat, bran, pollard, &c., has to be purchased at market rates, poultry may be fed liberally for less than three halfpence per week, and return a net profit for the year of 5s. or 6s. This is an estimate of profit that the careful person will greatly exceed. In a locality such as ours the climate makes it imperative that the birds be provided with a water-tight house. It is false economy to let fowls roost in trees, &c. In such cases much of the food they consume has to supply the heat to keep up bodily warmth, when it would otherwise go towards making eggs. The house should be half open-fronted and face the north to permit the unrestricted entrance of the germ-destroying and purifying rays of the sun. It is preferable that the perches be all on one level, 12in. above ground, and not on the old style like a ladder. Birds that are kept in restricted areas must, in addition to their ordinary food, be supplied with greenfeed. With foodstuffs at present market rates it is cheaper to make the morning meal of mash, consisting of pollard two parts, bran one part, and meat meal 1½lbs. per 100 birds daily, increased by one-third its bulk of lucerne chaff, than it is to feed both morning and night on wheat. This is apart from the much greater egg returns resulting from the more rational diet. It is no use putting good food into old hens; they will only lay for a month or two during the year when eggs are cheap. Except for breeding, do not keep hens after they are two years old; after that age they become unprofitable. The question of profit begins with the chicks. There is a right and a wrong time to hatch chickens. They should be hatched at such a time as to commence laying in March or April. This will bring the greatest financial returns. Chicks will thrive best if hatched between August and October. The common difficulty is to get a broody hen in July. My advice is, get a small incubator. In judicious hands it will pay for itself the first season. Now that the breeding season is at hand is the time to improve your flock. Get a pure-bred rooster of an egg-laying strain, and if possible a few good hens of the same breed. Do not go in for cross breeding. Failing this, pick out eight to ten of your best hens and place with the pure-bred male. All mongrel cockerels should be killed; they not only take the place of profitable pullets, but they lower the keeping quality of the eggs. When distinguishable, the cockerels should be yarded up separately, and fattened either for sale or home use. Young fat birds will realise good prices, and will be taken for export to England by the Government Produce Depot after January 2nd. Eggs should be gathered daily, and I would strongly urge all members for their own benefit to join an egg circle. Where strict attention is paid to cleanliness disease will be exceptional. However, where disease does appear in isolated cases the best treatment is a sharp hatchet and a strong arm." In reply to a question, Mr. Kühne said feather-eating could best be prevented by paring the beak.

Kybybolite, August 18.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), Lacey, Hahn, Smith, Pettit, Farrow, Koth, Duffield, and Scott (Hon. Sec.).

WHEAT-GROWING IN WET COUNTRY.—The Chairman read a short paper dealing with wheat-growing under the cold climatic conditions of this locality. After five years' experience he had come to the conclusion that it was a great mistake to sow wheat in this district when the ground was wet and cold. Although other factors might affect some cases, as a general rule it would be best to suspend drilling operations at the end of May until the middle of July. The intervening time, provided the condition of the soil would allow it, might be devoted to ploughing, &c., leaving the ground in a rough state and harrowing it before recommencing seeding. Seed put in during June took a long time to germinate, and from 20 per cent. to 50 per cent. of it would most likely not come up at all. In May, July, and August growth was much more rapid, and a weaker solution of pickle would satisfactorily prevent bunt than when the soil was very wet and cold. In this district it was best to drill as shallow as possible, provided, of course, that the seed was properly covered. The sun's rays were then more quickly responded to, and the crop came up well. Seed should be thoroughly graded or cleaned to remove seeds of weeds and cracked and small grains. In the discussion which followed, members considered May sowing the best. They could not speak from experience of the results attending spring sowing, as it had not been properly tested. The Hon. Secretary thought an early wheat like King's Early would be satisfactory for spring sowing.

Millicent, August 9.

(Average annual rainfall, 28½in.)

PRESENT.—Messrs. Holzgrefe (chair), Harris, Major, Hart, Mullins, Mutton, Williams, and Thompson (Hon. Sec.)

TREE-PLANTING AND PRUNING.—Mr. Hart introduced this subject and potato-storing for discussion, with the following remarks:—"The proper way to plant trees is to work the land in strips, digging down a couple of feet and leaving a piece about a foot square where the trees are to rest, so that the tree will not sink. Manure in rings round the plants on the surface, and in rough, lumpy land use two or three shovelfuls of sand to fill in around the roots when planting. I drive a stake in to lean over the centre of the dumping. Shape the dump to correspond with the shape of the roots. Stand the tree on the dump, and then tie it to the stake. You then have both hands at liberty to spread the roots and cover the bottom ones solidly and firmly before dealing with the upper layer. All roots should slope slightly downwards, and should not be any deeper than when the tree was in the nursery. In digging use the spade with the edge going from the tree, in order to skim the weeds off. Bury the weeds away from the trees, and throw clean soil in place of the earth you have removed. Those who own trees cannot do better than buy 'Fruit Tree Pruning,' by Geo. Quinn. Amateur pruners almost invariably start their young trees with too many limbs. Three to five is enough, especially for apples or pears, which get knocked off through the limbs striking each other if left too thick."

STORING POTATOES.—Mr. Hart mentioned that 'Potato Blight,' Bulletin No. 49, issued by the Department of Agriculture, deals with the storing of seed potatoes. He adopted the plan suggested—spreading them on 1½in. netting—about two years ago, placing the netting under pine trees. The potatoes kept remarkably well. A 100-yd. coil of netting cut in two, and placed side by side, with a lap of a couple of inches, will hold 4 tons or 5 tons of potatoes. He used logs, laid like railway sleepers, with battens connecting them, on which to lay the netting. A better plan would be to drive pegs in the ground and lay crosspieces on them. A good general discussion followed.

Mount Gambier, August 13.

(Average annual rainfall, 31½in.)

PRESENT.—Messrs. Sassanowsky (chair), Keegan, Botterill, Wheeler, Niquet, Dow, Pick, Sutton, Kennedy, Holloway, Watson, Kilsby, Smith, Major, Edwards, Pritchard, Ho'ding, Wedd, Buck, Ruwoldt, Mitchell, Schlegel, and Collins (Hon. Sec.).

FOOTROT IN SHEEP.—Mr. Botterill initiated a discussion on this subject. He thought that, owing to the great amount of grass, this year would be a particularly bad one for footrot. For the past three years he had adopted preventive measures, and had been more than satisfied with them. When a sheep's feet were really bad it took a considerable time to get them right. Immediately he saw any sign of limping, either in ewes or lambs, he put them through a solution of arsenic, 1½ozs. to the gallon of water for lambs, and for grown sheep a solution of 2ozs. to the gallon. The year before last out of 3,000 odd lambs they had not 20 with sore feet. Last year he did the same treatment, and out of 4,000 lambs he was sure they had not any footrot. It kept every lamb right on its feet. Not so with the ewes. They seemed to contract the disease at an earlier stage, and once through the solution would not cure those already limping, although it would prevent a good many from getting sore at all. The only thing to be done with those that were lame seemed to be paring, and then to put them through a solution of 2ozs. of arsenic and 2ozs. of bluestone to a gallon of water. He found that arsenic alone did not do all that was desired of it. There was always a certain amount of proud flesh on the foot which the bluestone however would eat away. All persons who were acquainted with sheep would know that the paring of the foot was difficult. The worker had to know exactly how much to take off, and how to avoid the blood-vessels in the toe. He had given his recipe for making the solution to many people, and they had been more than satisfied with it. The solution must not be too strong, nor the lambs be put through when too young. In reply to several questions, Mr. Botterill said he always used the solution cold. When they put the lambs through it was not desirable to let them run into a grassy place or a sandy yard. It was best to use a battened pen, and to leave them there a few minutes until the arsenic had dried on the foot. He used a trough 12ft. or 14ft. long and 15in. wide on the top with a slope, and put just enough solution in it to cover the hoof, a depth of 1½in. or 2in. They did not splash that. He had just had a cement trough made 12ft. long. He had always run the lambs and sheep through in August. This year

the lambs showed signs of being sore, and they would be put through the solution at once. No lambs had been lost through the solution getting on the ewes' udders, or any other cause. Foot-paring was a business that could only be learned by practice. It was necessary to get down to the bottom of every bit of rot, if possible without touching blood. If a sheep's foot was very badly affected it could be done; it was difficult otherwise. Mr. R. Smith thought that as soon as they had the first rains the feet should be pared and the sheep then run through arsenic. He ran his through once a month, and never had a lame sheep among them. Footrot was very hard to cure. Mr. Wedd thought the sheep got footrot through the manure getting between the hoofs. He used a hot arsenic solution, but no bluestone. The arsenic did not eat up the proud flesh between the hoofs, and the footrot came again. Mr. Botterill had heard of sheep contracting the disease in the yards. The timber was then very thick, and the ground very damp. The timber was now rung, and the ground was drier. It was prevalent on the richer land only; they would not find footrot on the poorer land. Mr. Kilsby agreed that rank herbage caused the feet to be always moist, and led to the disease.

WHITE-METALLING BEARINGS.—Mr. Pritchard read the following paper on this subject:—"White metal, or Babbitt metal, as it is sometimes called, is composed of various combinations of tin, copper, and antimony, and though it is so soft that it can be cut quite easily with a pocket-knife, it has wonderful wear-resisting qualities. It is used for shafts running at very high speeds, and sustaining great pressures. Moreover, it lends itself readily to the farmer's repair work, and it is to this branch that I propose to confine my remarks. The whole outfit that is necessary for the operation of white-metalling is a medium-sized lead ladle, a hack saw, an old rasp, a small twist drill, and a supply of white metal. This latter can always be obtained locally, and by its use many part of binders, harvesters, and other implements can be made better than new, at a considerably smaller outlay than would be required to purchase a new part. And, apart from the question of direct expense, there is the indirect expense caused by the loss of time to consider. Let us suppose that we have to renew a badly-worn bearing, and that the spindle that revolves in it is in fair order. The worse the bearing is worn the better job we shall be able to make of it, because, when finished, there will be a greater body of white metal to withstand the strain and wear to which it will be subjected. The first operation is to warm the spindle and bearing on the fire for a few minutes. Next, get them out of the fire and place the spindle in the bearing in the position which it occupied before any wear took place. Then pack sand which has been slightly damped all round the spindle and bearing closely, taking care that none of it gets into the space which the white metal is to occupy. While this work is being done the ladle, filled with white metal, should be on the fire. The melting point of white metal is very low, and great care must be taken in heating it, for, if it is allowed to become red hot, a good deal of its virtue is lost. Everything being now ready, the molten metal can be poured into the bearing, through the oil hole or some other suitable aperture, and, if the spindle and bearing have been well warmed, will fill up the worn place, and make a good fit. Allow a few minutes for the metal to cool, then remove the work from its bed of sand, clean all the sand off thoroughly, and trim off any rough edges which may project. Or, if it has proved a failure, melt the metal out of the bearing and have another try. If, however, the first attempt has proved successful, which is much more likely, the bearing may now be screwed up in the vice and the spindle turned around a few times, so as to loosen it a little. If the metal has been poured in through the oil hole, this will be stopped up, and it will be necessary to drill it out. The spindle and bearing may now be replaced in the implement to which they belong, but oil should be applied liberally and frequently when they are first worked, for there is bound to be a certain amount of stiffness. A point to remember is not to make the sand too damp. If it contains too much moisture steam will be formed when the molten metal is poured in, causing the hot stuff to splutter into one's face. Several of the rollers of a reaper and binder run in plain wood bearings, and consequently wear out rapidly. In most cases these can be renewed with white metal, often removing them from their places, provided the roller spindle is not too badly worn. Proceed as follows:—Place the roller spindle in its proper position and secure it there temporarily with whatever means are at hand. Then pack the sand around closely, making sure that there is no chance for the hot metal to force its way out. The metal will not burn the wood or hurt it in any way, and it makes an everlasting job. It is a good plan to bore a few holes into the sides of the bearing with a gimlet. The metal will run into these holes, and they will prevent it from working its way out. On one occasion, during the busiest time in harvest, one of the roller bearing cages broke in a most important part of one of the binders. Being unable to procure a new one to take its place, it looked as if the machine would have to remain idle until a new one

could be procured from the city. This would have meant a serious loss at such a time, so I decided to try white-metalling it. At the outset I could see quite plainly that if I ran such a large body of metal around the spindle it would shrink when it cooled, and would pinch the spindle so that I would not be able to move it. To remedy this I wrapped about two turns of paper around the spindle and gummed it there. I then proceeded to insert the spindle in its proper position in the shell, packed sand around the lot, as described before, and poured the metal in. The result was most gratifying, for the hot metal charred the paper slightly, and I was able to slowly work the spindle out, clean away the remains of the paper, and return the spindle and bearing to their proper place in the binder, which was at work again soon after, and did not give me any further trouble. I always adopt the paper plan when the metal completely encircles the spindle. With ordinary plain bearings, however, it will be found that in most cases the wear takes place only on one side of the bearing, so that by keeping the spindle in its original place the metal, when poured in, cannot completely surround it; consequently the spindle cannot be pinched through the metal shrinking on to it. It occasionally happens that a brass bearing wears out, say, in a chaffcutter, horseworks, &c. In such a case a repair may be effected in the following way. If the worn surface of the brass is first warmed, cleaned, and tinned over with a soldering iron, the white metal, when poured in with the spindle in position, will adhere to the brass, fill in the worn space, and make the bearing better than when new. White metal well run into such a bearing will last for many years, and give an extraordinary amount of wear considering its softness. These brass bearings, as is well known, are almost always in two sections, and a repair to them may be carried out after this manner. The spindle is placed in position in the lower half of the bearing; sand is packed around to prevent any metal escaping. The metal is then poured in until it rises slightly above the top of the lower half bearing. The surplus metal is then pared or sawn down flush with the edge of the brass, and the upper half of the bearing is placed in position, with a liner of paper between the two halves. Sand is packed around the whole lot, and the metal poured into the top half. The paper will prevent the two halves adhering to one another, and a thin liner of tin should be inserted before finally screwing down, to take the place which the paper filled; otherwise the bearing would be likely to pinch or bind on the spindle. This excellent metal can be used in many implements about the farm. I have repaired windmills, sawbenches, and even wheelbarrows, and would not be without it on any account." Mr. Pritchard exhibited some examples of white metal repairing and filling. He said the composition of white metal was about 75 per cent tin, and the balance antimony and copper. It would wear better than brass, although softer. The Chairman thought white metal one of the best things ever invented for the repairing of machines, as they could practically renew any bearing.

Naracoorte, August 13.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Coe (chair), Williams, Rogers, Caldwell, Wohlers, Langeludecke, jun., and Schinckel (Hon. Sec.).

EARLY AND LATE MATURING WHEATS.—In reply to an inquiry, the Superintendent Agriculture in the South-East (Mr. W. J. Colebatch) wrote as follows:—"At the outset I want to make it clear that a wider experience is necessary before the department can undertake and advise in such matters with any great degree of assurance. In the meantime information based on general principles may be furnished, and it is to be hoped that suggestions arising therefrom may prove of benefit until a more extended experience of the practical application of such principles as is now being gained at Kybylote and on the South-Eastern experimental plots generally is available. As a general rule it may be said that our South Australian soft-grained wheats are divisible into three groups—early, midseason, and late wheats. This division is based on their respective periods of growth. Each variety demands a certain definite amount of heat for its perfect development and maturity; the later wheats requiring more than the earlier ones. If the late wheats are sown late, particularly in a late locality, it is found that they have not, as a rule, become fully matured by the time growth is checked by the excessive heat of summer. This is due to the fact that the plants have not received the necessary amount of heat at the time they could make use of it, and as a result the grain is found to ripen off much too rapidly, to the detriment of its quality. In a series of observations at the Roseworthy College, covering the years 1906 to 1908 inclusive, Professor Perkins obtained

the following interesting figures :—With early wheats the periods between germination and flowering averaged 132 days ; with midseason wheats, 145 days ; with late varieties, 171 days. Between flowering and complete maturity, on the other hand, there was for early wheats an average of 47 days, midseason varieties 48 days, and late varieties only 35 days, thus showing how rapidly the final ripening of the grain had taken place. The early wheats in South Australia correspond to the European spring wheats. They shoot away very rapidly and show little tendency to tiller or stool ; it is these characteristics that adapt them so well to districts in which the sudden onset of summer makes the growing season so short. The midseason wheats are more similar in general character to the early varieties than to the late wheats, and they do well even in the drier Northern Areas, provided the season be a late one ; but it is in the south and south-eastern portion of the State that this middle group should find most favor. They stool more, make slower growth, but as a rule yield a larger amount of grain than the early varieties. The true late wheats, corresponding to the English winter wheats, have not proved very satisfactory in South Australia, and, except in one or two restricted areas in which climatic conditions are extreme, they may be regarded as unsuitable. Speaking generally, it may be said that in a district like Naracoorte the later the wheat the earlier it should be sown, and, conversely, the earlier the wheat the later it should be sown. This is the general principle, but many factors may arise which will render it necessary to modify the order of sowing in a way that is inconsistent with the above general law. For instance, the time of sowing a particular variety of wheat will vary with the character of the season, whether it be early or late, the depth and warmth of the soil, the purpose for which it is grown, and the condition of the land with regard to tilth at the time of seeding. Such departures, however, enforced upon us by the exigencies of the season, and the difficulty of reducing field operations to an inflexible system, in no way detract from the importance of the law based on scientific reasoning that the order of sowing should primarily depend upon the amount of heat required to enable the grain to germinate, develop the leaf, root, stem, and flower, and ultimately produce once more a prime sample of well-matured wheat. The statement that 'the earlier the wheat the later it should be sown' expresses my meaning somewhat tersely, but pertinently. There is a danger of the inference being drawn that early wheats might advantageously be delayed until the spring months. This, of course, is not intended ; for in writing these notes I have only considered the matter from the point of view of autumn seeding." In discussing the question the Chairman agreed with the views expressed by Mr. Colebatch regarding the general principles. A difficulty in this district, however, was the fact that some farms of 1,000 acres had only 200 acres fit for cultivation, and it was therefore necessary to crop the same land three or four times in succession. The result was that the soil became covered with weeds, and if a late wheat was sown the weeds soon got the upper hand. On similar "dirty" land an early variety, whether sown late or early in the season, had a much better chance of keeping the weeds in check. Where the soil could be kept free from weeds he agreed that it was best to put late wheat in early and *vice versa*. Mr. Williams had always reaped the best results from early-sown crops. He thought it did not pay to fallow in the South-East. Mr. Wohlers had secured the best crops from fallow land.

HARROWING AND ROLLING GROWING CROPS.—Mr. Rogers wished to know whether harrowing or rolling crops was beneficial in this district. Harrowing had benefited the crops near Millicent. Mr. Wohlers said that in the Horsham district it had been found necessary to harrow crops on account of the prevalence of the field poppy, and it was also found beneficial to the wheat. The Hon. Secretary had tried harrowing near Naracoorte, but found no beneficial results. There was black soil there, however, and it was very difficult to work properly owing to the harrows getting clogged. He thought it might be beneficial to harrow in the Hynam and Kybybolite country, but much depended upon the season and the condition of the soil. In wet country it would be of no use. Mr. Langeludecke had tried harrowing when the country was dry, and found it very beneficial. Mr. Williams said rolling crops was beneficial in loose soils. The Hon. Secretary said that along the Bordertown Road the crops in patches had been destroyed by wire worms, which were prevalent in many places in the district. They came out of the ground at night and ate the flag of the plant, which died off. These wire worms were in loose soil, and rolling would be beneficial. It was no use rolling in cloggy country, but where the soil was loose it was of benefit. He believed in rolling for hay crops. Mr. Langeludecke said the rainfall was so heavy in the South-East during winter that it set the soil sufficiently, and there was no occasion for rolling. Mr. Wohlers said crops were rolled in the Horsham district when up to the horses' knees. Rolling was always considered necessary there.

DESTROYING RABBITS.—The Hon. Secretary had recently purchased some land infested with rabbits in burrows. The burrows were mostly old wombat holes and difficult to

deal with. He filled the mouth of one of two with newspapers backed up with earth, and to his surprise they remained closed. He had since filled up many in the same way, and found it entirely successful. The ground would have to be dry. He would like the members troubled with rabbit burrows to try the plan and report results.

Penola, August 6.

(Average annual rainfall, 26½in.)

PRESENT.—Merris. Peake (chair), McDonald, Strong, Robinson, Fullarton, Wilson, Maxwell, Stapleton, Miller, Ockley, Warner, McKay, Ricketts, Richardson, Adamson (Hon. Sec.), and two visitors.

SCRUB COUNTRY FOR SHEEP.—The following paper on this subject was read by Mr. Fullarton:—"In selecting a piece of scrub country in this district one should always pick a piece of open heath plain. You will find a large variety of heath plants growing there that are not to be found in the stringybark ranges, and if it is well burnt it will become a good feeding ground, and stock will do well on it. Stringybark ranges are not good feeding ground, but in the rough and stormy winter months the sheep make for the ranges for shelter, and it is advisable to have a range of stringybark for that purpose. Heath country varies somewhat in the South-East, and some experience is needed to select a good piece of scrub which can be worked at a profit. It is better to understock heath country than to overstock it. You can keep sheep in a good, healthy condition, and they will cut a weighty fleece, and there will be no trouble in selling them. It is the greatest mistake to overstock, because sheep suffer, and it takes a long time to get them in condition, and probably there will be a break in the fleece, and a loss in the number of stock. The finer plants of heath are eaten out, and it takes scrub country much longer to recover than grass land after a severe doing. Keep your scrub well burnt, and choose days when a hot wind is blowing from the north. You will then get a clean burn. I would also recommend grubbing a space of 1yd. on each side of the fence. Half a dozen oil drums full of water will be useful to put out any posts that may get on fire. I would not burn the whole of a paddock in one season. It is better to keep a little rough heath until the young growth comes on. You will then have a little fresh heath each year. It takes heath about three years to grow after being burnt before you can fire it again. The number of sheep I consider a fair thing to put on good open heath is about one to six acres, and they should be changed on to grass country, if possible, every six or eight weeks. On shifting sheep be careful not to leave any in the paddock. It is better to have the weak ones carted home than to leave them to suffer. It is surprising to see how a weak sheep will recover after being put on grass, and in a few weeks can be put in the scrub again. The stock I should recommend for scrub is the best you can procure. It always pays to put on the best line of wethers you can purchase, and see you get them in good condition. One might be tempted at a sale to purchase a line of sheep that are a cheap lot to put on scrub, but it is a mistake to do this. Aged wethers or ewes are no good to you, and if they get poor they are only worth the price of their skins. Purchase four or six-tooth Merino wethers. You will find handling them a pleasure, you can recommend them as a first-class line, and have no difficulty in selling. I would not advise putting crossbred sheep on scrub. They are too loose in the wool, and their fleece gets too dirty. They will keep in quite as good condition as the Merino, but they seem to have the habit of rubbing themselves on the stringybark trees and charcoal. I find that sheep will do as well in the scrub in the summer months as on grass country, providing they get plenty of water and the scrub is nicely burnt. In turning fresh sheep into a scrub paddock they will hug the fence, so it is advisable to have a good look at all fences regularly, and keep the sheep in the middle of the paddock until they get accustomed to the run." A lengthy discussion ensued, and members generally agreed that the writer's methods were correct. They considered that overstocking of scrub country should be carefully guarded against. Mr. Ricketts had had many years' experience with this class of country, and said that if the sheep were frequently changed from paddock to paddock they might safely be kept on scrub all the year round. Mr. McKay considered that six acres of good heath was ample grazing for one sheep, and he advised burning the scrub in patches.

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Return of Professor Lowrie.

Readers of the *Journal* and producers generally will be pleased to learn that within a few months Professor Lowrie, M.A., B.Sc., will return to South Australia to take the position of Director of Agriculture. For some little time the Hon. J. P. Wilson, M.L.C. (Minister of Agriculture) has felt that



PROFESSOR W. LOWRIE, M.A., B.Sc.

the development of the experimental and educational work of the department rendered it advisable that the services of an agricultural authority, possessing the confidence of the producers, should be secured to take general control. Negotiations were accordingly entered into with Professor Lowrie, who is at present Director of Agriculture in West Australia, with the result that

he has accepted the offer of a similar position in this State, taking up his duties here on March 1st of next year. Professor Lowrie's work for the producer in South Australia is too well known to need any special reference. His persistent advocacy of the use of phosphates, the keeping of sheep, and the necessity for fallowing has borne good fruit, and has been no small factor in placing our agricultural industries on such a satisfactory basis. Professor Lowrie first came to South Australia in 1887 as Professor of Agriculture and Principal of the Agricultural College. In October, 1901, he resigned and went to New Zealand to take charge of the Canterbury Agricultural College, where his work was crowned with such success that general regret was expressed when he resigned that position about two years ago to take control of the Agricultural Department in West Australia.

A Promising Season.

It is gratifying to be able to record the fact that the present season gives every promise of being as good if not better than last, which beat all our previous records in agricultural production. With a considerably increased area under wheat it only requires good average conditions during the next few weeks to ensure a material increase in our wheat productions. From the grazier's point of view the season is equally favorable. The flush of the butter season started much earlier than usual, and with such a plentiful supply of feed throughout the country there is every prospect of this year's production exceeding any previous figures. To the end of September 456 tons of butter were shipped to oversea ports, compared with 120 tons to the same date last year, and a total of 455 tons for last season. The lamb export season has also opened well, the first big market during the last week in September reaching a total of nearly 10,000. Owing to the plentiful supply of feed, lambs are arriving in good condition, and satisfactory prices are being realised, viz., from 13s. for good to 17s. for prime lambs.

Opening of the Wool Season.

The first of the local wool sales of the 1910 season was held in Adelaide on Thursday, September 29th, when over 28,000 bales were offered; a total that constitutes a record for the opening sales. Price shows a decline on an average of 5 per cent. to $7\frac{1}{2}$ per cent., but this is largely due to the fact that on the whole the wool carries more condition this year; and while the price realised per pound is lower the actual return per sheep will probably average out satisfactorily. Generally the wool is in good condition, and

it is confidently anticipated that the clip as a whole will be a heavy one. The following figures show how the quantity of wool offered and sold compares with the quantities at the opening sales of the previous five years :—

Year.	Offered.	Sold.
1906	16,737 ..	14,032
1907	20,372 ..	19,863
1908	22,542 ..	20,802
1909	17,012 ..	16,124
1910	28,276 ..	23,810

The Bacon Industry.

The Trade Commissioner, in a report dated August 10th, writes—" Irish bacon at present is 6s. to 8s. per hundredweight dearer than it was at this time last year. Continental bacon is costing about 8s. more, and Canadian and American 10s. to 12s. more per hundredweight. To give some idea how the shortage is affecting home stocks, there were in Liverpool on July 30th only 6,961 boxes of bacon as compared with 12,351 boxes at the corresponding date last year. The supplies from Canada and America are steadily falling off, and the time is not far distant when there will be no surplus in these countries available for export. I am convinced that if the farmers throughout South Australia would set themselves to breed pigs there is a magnificent future before them. In my opinion the development lies in curing the bacon on the spot and shipping it in the refrigerator. Frozen pork is right enough when it arrives if it is to be used fresh, but there is only a very limited number of curers here who understand how to handle frozen pork so as to produce well-cured good bacon from it. One of the largest importers here of American and Canadian pork, who is well acquainted with Denmark, and has followed the egg circle movement in South Australia since its inception, writes—" If only the South Australian farmer could be persuaded to go into pig circles on pretty much the same lines as they have already worked up the egg circles, and could be induced to send forward a regular supply of pigs to a central slaughter-house and packing-house in South Australia, there is assuredly a magnificent future before the industry.' "

Spraying for Codlin Moth.

Last year some interesting experiments in spraying apples with arsenate of lead to destroy codlin moth were carried out by the New York State Entomologist. Chief interest was attached to the effect of a somewhat coarse spray applied with considerable force as against a fine, mist-like application.

The results in this respect were, however, inconclusive, as although the latter gave a slightly higher percentage of clean fruit the difference was not sufficient to warrant the opinion that it was the better from a practical standpoint. In regard to the protection afforded by spraying, the sprayed trees gave 98.5 per cent. to 99 per cent. of clean fruit against 72 per cent. from the unsprayed trees. It was further noted that one thorough spraying before the calyx was closed was nearly as effective as where two additional applications were made. In a careful examination of over 100,000 fruits from the experimental plots it was found that whereas on the sprayed trees an average of about 13 per cent. of the affected fruit was attacked from the calyx end, on the unsprayed trees over 69 per cent. of the affected fruit was so attacked. It is evident from these figures that the major portion of the caterpillars were killed in or about the blossom end, a fact which emphasizes the necessity for thorough spraying early in the season after the petals have fallen.

The Day-old Chick Trade.

In California quite a number of large firms have taken up the business of hatching chicks and selling them to poultry-keepers when only 24 hours to 36 hours old. This industry was started in the famous Petaluma district about 10 years ago and has been so successful that it is stated that from this district alone about 3,000,000 day-old chicks are sold annually by the hatcheries as they are termed. It is stated that these chicks are sent in thousands on rail journeys occupying as much as three days, and the fact that the percentage of losses is very low speaks volumes for the vitality of the breeding stock. The firms engaged in this business make the rearing of high-class laying strains of fowls a special study.

Protecting Young Trees from Rabbits.

Various methods are adopted for the protection of young trees against injury by rabbits and hares when the orchard cannot be fenced. The simplest and cheapest is stated to be the application of fresh blood and lime, or rubbing the stems with fresh beef or pork liver. The application of lime and sulphur, made in the following way is also recommended by Ohio Experiment Station :—Slake 1lb. fresh lime in a small quantity of hot water ; add this and 1lb. of flour sulphur to 1gall. of water and boil for one hour. Thin with enough hot water to make 3½galls. and apply fresh, stirring well. This preparation will also destroy scale and other insects.

Distribution of Exports.

"The following figures will, I think," wrote the Trade Commissioner on August 10th, "help to confirm my constant advocacy of a wider distribution of South Australian produce throughout the United Kingdom rather than centre the whole in London :—

Total Quantity Apples Exported from United States of America and Canada.	PORTS OF IMPORT.				
	Liverpool.	London.	Glasgow.	Hamburg.	Other Ports.
2,212,474 barrels	878,052	612,354	452,853	73,931	192,224
460,362 boxes	145,486	211,875	45,388	22,516	35,099

One barrel is equal to three boxes.

"When criticising my methods of marketing fruit, a prominent Adelaide merchant stated that his firm had been shipping fruit to London for many years, and were of the opinion that Covent Garden, London, was the only place to send South Australian fruit to, or words to that effect. From the following figures it will be seen that Canadian and American shippers are not of that gentleman's opinion. In regard to this question, a large importer of fresh fruit writes—'I cannot understand why the growers of apples in Tasmania and Australia ship most of their fruit to London, as you will see that Liverpool is a much larger market, and when shipped to London the apples have to be, in many instances, transhipped to Liverpool and Glasgow. Glasgow also takes almost as many apples from the United States of America as London does, and Liverpool takes 50 per cent. more than London.' Of the 192,224 barrels and 35,099 boxes shown as going to other ports a large proportion went to Hull, Manchester, and Liverpool direct."

Water in the Soil.

The importance of water in the soil has not been as well understood as it should be. Common soil contains as much as 400,000,000 separate particles to the ounce, and between these are infinitely thin layers of what the modern soil doctor calls "film water." It is on this film water—not on the soil itself—that plants feed, for it dissolves from the earth particles of food which the plants require to keep them well. The plants feed, too, on air—not only the air above the surface of the earth, but that which permeates the minute cracks between the earth particles. Ninety per cent. of any crop taken off a field comes, not from the soil of that field, but from the air above and in it. Water, however, is the most important medicine which the soil doctor knows. The amount of water needed to grow 1 ton of common

hay has been calculated to be sufficient to cover a one-acre field more than a foot deep. Fortunately for the farmer, even the driest soil, when compressed, is discovered to contain more than half its own weight on film water. Too much water in the soil is as bad as too little, for if the soil is waterlogged the crop will get "drowned" as surely as any man can be drowned in a body of water.—(Campbell's *Scientific Farmer*.

Thinning Peaches.

In Franklin County, Pennsylvania, there is a large peach orchard, containing over 9,000 trees of from eight to ten years of age, which, in 1908, produced peaches to the value of \$65,000. The owner, Mr. D. M. Wertz, is a strong believer in thinning the fruit, not only to secure better quality fruit but also to prolong the life of the trees. He states that it costs him more for thinning than it does for harvesting, but the work pays. As many as 100 men are employed for several weeks at this work. In thinning the fruit not more than eight peaches are left on a 3ft. branch.

Selection and Change of Seed.

The United States Bureau of Agricultural Chemistry has recently issued a report on some experiments carried out over a period of four years to ascertain, if possible, the extent to which the composition of wheats was affected by the conditions under which they were grown. The following is one of the conclusions arrived at from the data available:—"Wheat of any one variety, from any one source, and absolutely alike in chemical and physical characteristics, when grown in different localities possessing different climatic conditions, yield crops of very widely different appearance and very different in chemical composition. These differences are due for the most part to climatic conditions prevailing at the time of growth. The results so far obtained would seem to indicate that the soil and seed play a relatively small part in influencing the composition of crops. Crops should be improved in the locality in which they are to be grown, or the seed should be selected from a region which has similar climatic conditions."

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture, Adelaide.*"

GROWING POTATOES ON BURNT SWAMP LAND.

"A.R.B.," Monteith, writes—"I should be pleased to know whether potatoes would do well on swamp land that has been burnt, the depth of such burning being from 9in. to 12in. deep in places."

Mr. S. McIntosh (officer in charge of irrigation and reclamation) replies—"If the soil has been well drained to a depth of at least a foot below the burnt surface and then thoroughly cultivated so that the ash and burnt soil are both properly mixed with the true soil, a fair crop may be expected; but it is always advisable to fallow and thoroughly work any land on the newly reclaimed area for at least six months before cropping with potatoes. Burnt soil requires similar treatment if maximum results are wanted."

DISEASE AMONGST MARES.

"Meningie" writes—"There is a disease somewhat prevalent around here amongst breeding mares, which usually takes place about six to eight weeks after foaling. The udders swell right along up to the chest, the animals lose their milk, and in some cases the udder bursts and comes right away. No cases have as yet proved fatal. Can you let me know the cause and cure (if any)?"

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"History and symptoms indicate a contagious form of mastitis or inflammation of udder. Injection of warm 4 per cent. solution of boracic acid into udder is most effectual treatment."

SAND IN HORSES.

"Northfield" writes—"I would like to know the best method to treat horses for sand."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Horses affected with sand should be fed for a few days on bran

mashes in which a little raw linseed oil has been mixed. If in pain they should get loz. doses of chlorodyne in a pint of water every four hours until pain ceases."

MARES SLIPPING FOALS.

"Rhine Villa" writes—"In the event of a draught mare slipping foal, is it advisable to give her a year's spell or put her to the horse the following season?"

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Unless it was a case of contagious abortion, there would be no necessity to give the mare a year's spell."

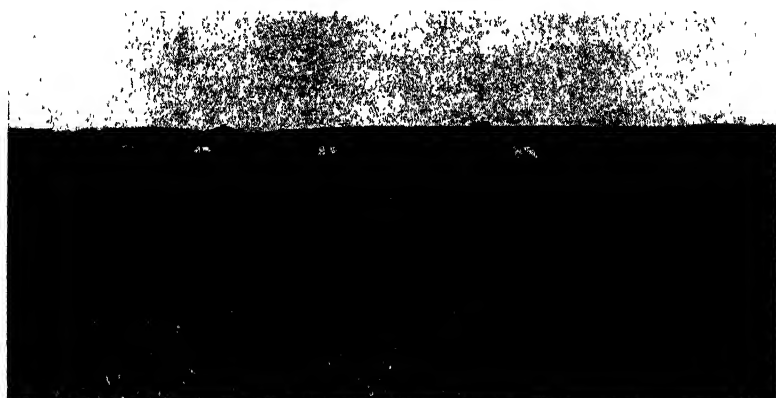
FEEDING VALUES OF RYE, BARLEY, AND PEAS.

"J. A.," Echunga, writes—"In the August issue of the *Journal* I note an inquiry from 'E. S.,' Port Lincoln, in reference to the feeding value of rye for stock, and the reply given by Mr. Colebatch. (1) Would you now state how these two cereals compare in feeding value with field peas for the fattening of bacon pigs? (2) What feeding value would there be in the barley straw (after being headed) for milch cows?"

The Acting Principal of the Roseworthy College (Mr. W. J. Colebatch, B.Sc., M.R.C.V.S.), replies—" (1) Peas are highly nitrogenous for food stuffs, and when fed to pigs tend to increase the proportion of lean meat and to improve the quality and firmness of the bacon. As a muscle-forming foodstuff they are especially useful for pregnant sows and throughout the growing period of young pigs. According to experiments it appears that when fed to baconers ground peas and bran (equal parts) produce a gain of 100lbs. for every 363lbs. of the mixture. Barley meal produces the same increase when fed to the extent of 471lbs.; maize meal, on the other hand, gave an increase of 100lbs. for every 435lbs. consumed. Unlike barley or rye, peas cannot be satisfactorily fed during the fattening period for any length of time without being mixed with some of the more carbonaceous foodstuffs such as barley, wheat, or maize meal. It is for the production of high quality, lean, sweet pork that peas are best adapted when fed for fattening purposes. Pound for pound, they give a higher increase than almost any other fodder; but if the ration be too rich in nitrogen the health is apt to suffer; and, furthermore, the same amount of benefit is not derived as when the nutritive elements are better balanced. When pigs are turned into a paddock of peas they do not suffer so much from the albuminous nature of the diet, as they consume large quantities of straw and weeds, and, in addition, they take a considerable amount of exercise at the expense of the nitrogen they are assimilating. When peas are trough fed for fattening purposes they should be combined with ground barley, wheat, or maize meal. (2) Barley straw is nothing like as rich in nitrogen as oaten straw, but contains slightly more carbo-hydrates and a little less fat. It is richer

than wheaten straw in all the essential nutrients, and is eaten more readily by cattle. In the winter time it may be fed in conjunction with mangolds to all classes of cattle, but it should never form a very big proportion of the ration in the case of milking cows on account of its low albumen content and its fibrous indigestible nature. Where it becomes necessary to use it in large quantities a heavy grain ration should be fed in conjunction. Appended is a table showing the relative values of wheat, oat, rye, and barley straws :—

	Water.	Dry Matter.	Digestible.		
			Protein.	Carbo-hydrates.	Fat.
	%	%	%	%	%
Wheat	9.6	90.4	.4	36.3	.4
Oat	9.2	90.8	1.2	38.6	.8
Rye	7.1	92.9	.6	40.6	.4
Barley	14.2	85.8	.7	41.2	.6



REAPING ON A LARGE FARM.

AGRICULTURE IN OTHER LANDS.

By Professor PERKINS, Principal of Roseworthy College.

TURKEY IN ASIA.

My visit to Turkey in Asia was confined to the neighborhood of Smyrna, Bondjah, Bonmabat, Bonmabashi, and, subsequently, Scutari and Brusa, in the neighborhood of Constantinople.

Smyrna is the centre of the dried fig and sultana raisin industries. Had time permitted I had intended making thorough inquiries into these two industries. As things turned out, this, unfortunately, was not possible. I gathered that the dry fig industry was in a fairly flourishing condition, which is more than can be said of the raisin industry. Some years back the phylloxera destroyed the sultana vineyards of Smyrna. At present all the vineyards are grafted on American stock, and it appeared to me that the young growth that I was at the time able to observe was very far from showing that healthy, vigorous appearance so characteristic of the same variety in South Australia.

Whilst in the neighborhood of Constantinople I had occasion to visit Brusa, the first capital city of the Ottoman Empire. The whole of the neighboring country appears to be almost entirely given up to the silkworm industry, fully three-fourths of the population being, it is stated, either directly or indirectly interested. Plantations of mulberry trees are exceedingly numerous. These trees are either intermingled with olive trees or vines, or more frequently planted by themselves. It appears the current practice to plant them very closely together (30in. to 40in.), and to maintain them in dwarf condition, presumably to facilitate the picking of the leaves.

The value of bare fallowing appears to be recognised, for I came across many fields in good condition of tilth and receiving at the time their second ploughing.

The principal field crop appeared to be wheat, with occasional fields of barley, rye, beans, and flax. Some of the crops were very creditable; but the majority were either yellow with charlock or scarlet with poppies—quite another poppy from our old enemy: a more gorgeous, strong-growing individual, and apparently equally pertinacious.

I saw some well-grown groves of almond trees, although orchards, as a whole, have here all the appearance of an overgrown jungle or thicket.

The bulk of the ploughing appears to be done by oxen, although buffaloes are to be seen grazing at large in the fields. I believe they are reserved mainly for cart work.

Formerly the bulk of Asia Minor sheep were of the fat-tail breed. To-day the Greek type of sheep appear to be supplanting them. I secured in a butcher's shop a good photograph of the dressed carcass of a fat-tail sheep, which I hope will not prove without interest in South Australia.

From Constantinople I had originally intended going to Tunis and Algiers. I found, however, that I had dallied too long in the East; and decided, therefore, to proceed without delay to England via Marseilles and Gibraltar. I propose visiting North Africa later, in November or December.

GREAT BRITAIN.

I landed in England on May 21st, and made London my headquarters till June 20th. I found time during this period to visit His Majesty's Estate at Sandringham, the Windsor Farms, Lord Rothschild's Tring Estate, and the Rothamsted Experimental Station. In addition, as directed by cablegram, I proceeded to Gainsborough to examine the agricultural motors of Messrs. Marshall & Co.

At Sandringham I was interested chiefly in the Southdown sheep, the flock being an exceptionally fine and even one. From the funds kindly supplied for the purpose by Mr. Alick Murray I have purchased here for the College 15 two-tooth ewes, which the manager (Mr. F. H. Beck) has consented to put to two very fine rams which I was permitted to select. One of these rams is, I think, quite the finest specimen of the breed I have seen; indeed, in my opinion, he was a long way ahead of anything exhibited at the Liverpool Show.

This was my first visit through the country parts of England, and I was considerably surprised to notice how dirty the crops showed up from the railway line. Our old friend charlock seemed to be showing up everywhere: indeed, since then I have not succeeded in avoiding him wherever I have been. I am informed that this is abnormal. It is attributed to the exceptionally wet summer in 1909, which hindered cultural operations. As, however, in the majority of cases in England wheat follows red clover, which is first cut as hay and then grazed, I fail to see the strength of the argument.

Unfortunately my visit to the Windsor Farms was not altogether a success. It had been pouring with rain several days in succession, and rained also on the day of my visit. Beyond, therefore, looking over some very fine stabled Shorthorn cattle, I was not able to see much.

I was pleased to have the opportunity of visiting Lord Rothschild's Tring Estate, as it would enable me to see what milking Shorthorns were like. I must say that the latter are very different in type from what we had been led to expect from South Australian examples. I have no hesitation in describing them as magnificent types of dairying animals. I was introduced to one cow—Darlington Cranford V.—which, according to Mr. Richardson Carr, Lord Rothschild's agent, yielded a quarter of a ton of milk a week,

notwithstanding the fact that she was 12 years old. Her son and grandson—Conjurer and Ranger—were two magnificent examples of dairy bulls.

Lord Rothschild is also the owner of a very fine Jersey herd. One cow—Gauntlet VI.—gave nearly 2lbs. of butter a day from 41lbs. of milk.

As an admirer of the work of Lawes and Gilbert, I very naturally made my pilgrimage to Rothamsted, where I was given every facility to look over what had been and was still being done. The plots are still continued on the lines that the writings of Lawes and Gilbert have rendered so familiar. The laboratories and sample-rooms were also full of interest to me. New lines of experimental work are being opened up, and there is no doubt that the work initiated here early in the nineteenth century by Sir John Bennett Lawes is being continued in a manner that he would approve of.

THE NATIONAL SHOW.

The Show of the Royal Agricultural Society was held this year at Liverpool, between the 21st and 27th of June. I attended the show on four consecutive days, but in view of its vastness and complexity I found myself unable in this time to do more than go thoroughly over sheep, cattle, and heavy horses, and cast a rapid glance over farm machinery exhibited.

Before entering upon details let me say that one of the leading features of the show, if one were to judge from the constant stream of visitors attracted to them, were the advertising booths of Canada and of British East Africa. With true insight into the proclivities of the average Briton, the British East African exhibit consisted almost exclusively of trophies of the chase: the natural moral being—Who would not go to a country where such game was to be seen from your back door? Canada dwelt more on the opulence of her resources, and proved almost equally attractive to visitors. I was struck by the fact that the stream of visitors to these two booths consisted almost exclusively of the rural type—that is to say, the type of settler most in demand in new countries. Victoria and Western Australia also shared a booth in common; they did not, however, appear to share the popularity of the other two. The rest of Australia was conspicuous by its absence. It appears to me that if we are at all desirous of attracting rural settlers from the old country the numerous shows held throughout its length and breadth should form excellent advertising media.

My first day at the show was given over to sheep. Of these there were representatives of 24 breeds, many of which were quite new to me, and others with which I had been formerly familiar had undergone manifest improvement.

As South Australians in general are not familiar with many of these breeds I shall summarise below a few notes on each, which I had occasion to put together in the course of my examination of the several pens.

Oxford Downs.—Not a very large exhibit, represented by about 50 pens of sheep. These appeared to me as the best all-round sheep of the show, with the exception, perhaps, of the Suffolks. They are fine, large, compact sheep, with good all-round conformation, and without any suggestion of coarseness. They carry fine, sound, useful fleeces. I am surprised that they should not have been availed of more freely in Australia. They should prove magnificent mutton sheep in good pasture country.

Shropshires.—Shropshires are too well known in Australia to call for any comment on my part. They formed by far the largest exhibit in the show, being represented by 118 pens. The prices secured for rams at some of the auction sales appeared very satisfactory. On the whole, it appears to me that Shropshires acquire greater size in South Australia than appears to be the case in Britain. I might add that with this breed the tendency to wool-blindness is as common here as in Australia.

Southdowns.—A relatively small exhibit, represented by 65 pens. In view of the fact that, thanks to the generosity of Mr. A. J. Murray, I was commissioned to purchase some of these sheep for Roseworthy, I went over the show exhibits very carefully. I must confess to having experienced a certain amount of disappointment over them. I have since had occasion to inspect some of the leading flocks at their homes, and I am compelled to the belief that the best types of the breed were perhaps not to be seen at the Liverpool Show.

Hampshire Downs.—Represented by 56 pens of sheep. A coarse, heavy-looking sheep; inclined to be leggy, and with large, heavy head. I was not attracted by this breed, and, judging from the appearance of the younger exhibits, they do not acquire any beauty of form until wellnigh to maturity.

Suffolks.—Represented by 23 pens of sheep. A very fine class of sheep, and likely to be useful in Australia, either as mutton sheep in good pasture or for crosses with Merino. They are more finely built than the Hampshires, with lighter head and bone, and with more active, sprightly carriage. As a breed they appear to me to lack somewhat in compactness.

Dorset Horns.—Sparsely represented by only 19 pens of sheep, and these by no means very meritorious. I have seen finer Dorset Horns in South Australia.

Ryeland.—Represented by 17 pens of sheep. The breed appears to me a promising one. Well built from the point of view of mutton, and well woolled throughout.

Kerry Hill (Wales).—Represented by 17 pens. Medium size sheep, with white faces blotched with black. Narrow chested, flat-ribbed sheep; not likely to be of much value to us.

Lincolns.—Represented by 51 pens of sheep, including some very fine animals. I think, however, that I have seen them equalled in Australia.

Leicester.—Represented by 21 pens of sheep, the great majority of which were very attractive.

Border Leicesters.—Represented by 30 pens of sheep. This breed is, I believe, popular in certain portions of Scotland. On the whole, however, it is too leggy to prove attractive.

Wensleydales.—Represented by 24 pens of sheep. A large, rather slackly-built breed, with heavy blue-grey face with topknot. These sheep may have their merits. I was not, however, attracted by their appearance.

Derbyshire Gristone.—A fairly well developed medium-sized sheep, with black and white face and points; represented by 14 pens. Does not appear likely to be of much interest in Australia.

Lonks.—A large breed, with horns in both sexes. Rather heavy, uncouth sheep; of no probable interest to us.

Romney Marsh.—Well represented by 81 pens of sheep, the bulk of which were a credit to breeders. This breed is also well known in Australia, and is, perhaps, deserving of greater popularity than it has hitherto succeeded in securing.

Cotswolds.—Reputed one of the largest of British breeds, and represented by 29 pens of very fine sheep. I have never heard of their importation to Australia, although I understand that they are well liked both in Canada and the United States.

Devon Longwool.—Represented by only five pens of sheep. Appear smaller and more compact than the South Devons, but otherwise similar.

South Devons.—Represented by 19 pens of sheep. Large, leggy sheep, with plenty of barrel length; white, hornless face, with short, drooping ears. The lambs are unattractive, and apparently slow developing. Of no probable interest to us.

Dartmoor.—Represented by 15 pens of sheep. Very large, leggy sheep, standing exceptionally high. Of great length of carcass, but generally lacking in depth, and inclined to be flat ribbed. Heavy, hornless, whited head, blotched with black; points white; wool curly and lustrous. Of no interest to us.

Exmoor.—Represented by 18 pens. A medium size very compact sheep. They are exceptionally broad, and well built. The rams carry heavy horns, very like those of the Merino in appearance, whilst the ewes carry narrower light horns. These sheep have a distinctly aquiline profile, and, like Merinos, are woolled all over, including legs and purse. The nostrils are black, and the face reddish. I hesitate to say anything as to their possible value to us, as I cannot claim sufficient knowledge of them.

Cheviot.—Represented by 11 pens of sheep, all from the same breeder in Northumberland. Later on I had often occasion to admire the picturesqueness of the Cheviots in Scottish fields. At Liverpool they were shown in the wool, and had not been tailed. They are relatively large sheep, with great

carcass length. Their faces are china white, with a crest of wool at the back of the head. The profile is aquiline. The ears are long, and mobile, and carried erect, giving the head almost a hare-like appearance. There are occasional black spots in the ears. Although the breed is reputed to be hornless, almost all the rams I examined had short stubs of horns.

Herdwick.—Represented by 12 pens of sheep. A breed, I believe, restricted almost exclusively to the high hilly pastures of Westmoreland and Cumberland. I am told that this breed is exceptionally hardy; that it will thrive where no other breed can live. It may be so, but, judging from the specimens I had occasion to see later on in Westmoreland and Cumberland, hard times have frequently had the effect of stunting these sheep to a ridiculous degree. The breed is small and active looking, always on the alert; short-legged and close to the ground, and generally abnormally pot-bellied. Their general appearance is very unprepossessing.

Welsh Mountain Sheep.—Represented by 32 pens, and by far the most attractive of the mountain breeds. On the whole, long in the barrel and short in the leg. Rams alert and handsome, horned, and with white faces and legs. Ewes showed a tendency to sandiness in face and points. Inclined to slackness in general build, and flat ribs. Rams generally compact and sturdy, with horns curling back, but not spreading, which gives a narrow appearance to the head. Not tailed.

Black-faced Mountain Sheep.—Small sheep with short legs. Black faces blotched with white and black points. Horns in both sexes; broad and powerful in rams, and narrow and spreading ewes. Like all mountain sheep, not attractive in appearance—especially after shearing, which in the Highlands at all events is carried out in the most perfunctory manner. I saw some sheep from which one would have said that the wool had been torn off in handfuls.

CATTLE.

Shorthorns.—Out of a total of 826 cattle entries 349 were represented by Shorthorns—that is to say, over 42 per cent. of the total entries. Beyond this fact a visitor to the show could not but be struck by the extent to which genuine farmers tended to cluster round the Shorthorns, whilst other sections were left very largely to casual visitors. That the exhibition of Shorthorns was magnificent cannot be denied. To me these cattle did not appear to have been fattened up to the abnormal extent that we have been accustomed to in the Adelaide and Melbourne shows. They were sufficiently fat to show off their wonderful symmetry of form, but not to the extent of practical deformity. That in aiming at the production of beef-producing animals the milk-producing capacity of the breed has been very considerably impaired has not been lost sight of by the English farmer. On all sides I heard it stated as the opinion of apparently competent men that the introduction

of Scotch bulls to English herds had had the effect of ruining the dairy industry. The show authorities themselves have not been slow to recognise the turn of the tide, and numerous prizes are offered for both bulls and cows of good dairy strains. I notice in this connection that bulls competing in these sections must have sprung from dams having secured a certificate of merit in a milking trial or test, or in classes set apart for pedigree dairy Shorthorns. From what I have been able to see there is no doubt that in the capable hands of English breeders the Shorthorns are rapidly acquiring that dual purposedness that appears to be essential to modern conditions of farming.

Lincolnshire Red Shorthorns.—This breed, which was represented by 39 entries, appeared to me to include some magnificent dual-purpose beasts. These cattle are exceptionally large and well proportioned, whilst most of the cows had magnificent udders. In color they are a whole red.

Herefords.—Represented by 77 entries, and coming therefore third in the list of importance. One could not help admiring this breed for its general beauty of appearance. Most of the cows, however, were sadly deficient as milk-producers.

Devons.—Represented by 25 entries. I see much to admire in this breed that is not commonly met with in Australia. Whole red in color, the cows have fine spreading lyre-shaped horns, whilst the bulls have stout uprising ones. The beef conformation is certainly magnificent, whilst the majority of the cows had the appearance of good milkers.

South Devons.—Represented by 25 entries. Very large, all-red cattle, with horns between the Shorthorns and Devons in size and type. The cows appeared good milkers. Heifers and young bulls were generally more or less lanky and gawky—a clear evidence of relatively slow development.

Longhorns.—Represented by 16 entries. Large cattle, with long, drooping horns, not unlike the tusks of a young elephant. Black and white, or red and white in color; generally with a symmetrical white line along the spine. Beef conformation only moderately good. Many cows should prove good milkers.

Sussex.—Represented by 24 entries. Whole dark-red in color, with horns of moderate length. Carcass development good, but cows not likely to make good milkers.

Welsh.—Represented by 21 entries. Medium size all-black cattle. Bulls with short, sturdy horns; cows with narrow horns, recalling those of the Devon. Cows always show a little white in the neighborhood of udder. Moderately well developed for beef, but not likely to make heavy milkers.

Red Polls.—Represented by 47 entries, and, on the whole, a very fine section of the exhibit. The majority of the cattle exhibited were a good bit darker red than we are accustomed to in South Australia. One might almost call them “black-reds.” All were characterised by a pronounced

orange ring round the eyes. The cows were all excellent milkers, or showed very good beef conformation.

Aberdeen-Angus.—Represented by 44 entries. This class is characterised by truly marvellous beef development; in this direction I suppose it stands quite apart. The reverse of the medal, however, is the condition of the cows, whose udder it would need a microscope to discover. How some of them can rear their calves is more than I can understand. Whilst full-grown beasts are whole black, calves and younger beasts frequently show ruddy tints, whilst one calf was as red as a Red Poll.

Galloways.—Represented by 16 entries. Another black, hornless breed. Smaller generally than the Aberdeen-Angus, and with an abundance of coarse hair on the poll. Good beef development, and better dairy appearance than the preceding breed.

Highland.—Present only as curiosities. A rather small breed of whole-red cattle, with long horns and an abundance of shaggy hair.

Ayrshires.—Poorly represented by 10 entries. I cannot say that I was impressed by this section. I have seen better types of the breed in Australia. There were only two bulls exhibited, and these lacked masculinity, and were altogether steer-like in appearance.

Jerseys.—I was surprised to find that amongst cattle Jerseys, with 88 entries, should come second in the list in importance. I must state, without reservation, that the exhibits of Jersey cows were simply magnificent; it is questionable whether a more attractive lot of milkers could have been got together. The udder development of some was extraordinary. In the bulls generally I was disappointed. The great majority of them were inclined to have a steery appearance; and none, to my mind, was the equal of Black Antimony.

Guernseys.—Represented by 23 entries. In color for the most part red and whites. This breed is considerably larger and coarser than the Jerseys, and have every appearance of good milkers.

Kerry.—Represented by 19 entries. All-black, medium-size cattle. Bulls, with medium-size short horns; cows, with fine spreading horns, recalling those of Ayrshires. Horns generally white, with black tip. Cows have the appearance of fair milkers.

Deaters.—Represented by 40 entries. Small, all-black cattle, some cows carrying magnificent udders. Red occasionally present as a color. In this instance the champion cow was red.

HORSES.

I was able to admire the heavy horses on parade. Time did not permit of my seeing the light horses. The heavy horses were represented by Shires (86 entries), Clydesdales (78 entries), and Suffolks (25 entries). Additionally there were exhibits for draught geldings and for draught horses in grass.

I was much impressed by the Shire exhibits. The champion Shire stallion was certainly the finest draught horse I have ever had the pleasure of seeing. Beside the Shires the Clydesdales had an almost weedy, slack appearance. Some of the Clydesdale brood mares were very fine. Suffolks formed very handsome exhibits; all very fat and very showy, but very few, in my view, form the ideal draught horse.

Pigs.

On the whole I was disappointed in the pigs. We could easily have shown against them without suffering by comparison.

Large Whites.—Represented by 94 entries. A very fine class; perhaps the finest in the show.

Middle Whites.—Represented by 57 entries. Also a good class, approaching more closely in size the type of pig found most useful in Australia.

Tamworth.—Represented by 54 entries. A fine class; an improvement on anything I have seen in Australia in this breed.

Berkshires.—Represented by 62 entries. On the whole I was not much impressed by these exhibits. There were, however, a few very good sows. Youngsters generally poor. The judges appeared to pay very little attention to the recognised markings and color of the breed. Sows with white ears took prizes; and many prizewinners were splashed with white right up their legs.

Large Blacks.—Apparently a very popular class here, because of their size—some fine monsters exhibited. I noticed that some boars carried quite a quantity of hair.

Curly-coated Lincolns.—This was my first introduction to this breed, and I cannot say that I was much impressed by it. They are white pigs, exceedingly unwieldy in size, and covered with a thick, curly coat of hair. They are, to my mind, too large for Australian requirements, and if a large pig is needed the large white appears to me superior.



THINNING FRUIT.

By PROFESSOR W. T. CLARKE, California University.

But the objection is immediately raised that this is an expensive operation, returns from the orchard are already small, and any added expense would be over-burdensome; and, further, why should I, the orchardist here, have to do this when my neighbor, the orchardist there, does not do it? Of course, the process of thinning is expensive. For that matter, anything that is worth while costs something, and the only gauge we can supply here is the one comprised in the question, "Does it pay?" The process certainly does pay those who practice it, and will pay any who may undertake to do this sort of work. The added expense is more than justified through the enhanced returns, and whether our neighbor does this particular piece of work or not is no reason for us to neglect it. Better fruit of a better quality will be the reward of careful thinning at this time. Then there is another item of profit in this matter of thinning that we should certainly figure on. Let us take as a specific illustration the peach, the wonderful fruit that grows in such perfection in California. Our peach orchard should be looked upon as a permanent investment, and not as a very short-lived money-maker. We should put the trees and the land upon which they grow to no undue and uncalled-for strain. We have made our plantings in orchard form, we are growing the trees for the fruit they may produce, and not for the seed, and, therefore, it is not the greater number of peaches of small size that we want. It is the peach of a fair standard size we expect to produce, and in doing this we must sacrifice in numbers what we more than make up in enhanced sizes of the individual which we allow to mature. The faculty of reproduction, the seed-growing faculty, is the greatest possible strain to the tree and to the land upon which it grows, and will be usually indulged to the full if we do not interfere. It is the fruit we want, and not pits. We can show mathematically what enhanced sizes mean in the way of more fruit and fewer pits. Suppose our peaches run $1\frac{1}{2}$ in. in diameter, each peach will then have a content of 1.38 cub. in. If, on the other hand, they run 2 in. in diameter, then they will each have a cubical content of 4.19 in. Again, if they fill a $2\frac{1}{4}$ in. ring, their cubic measurement will be 5.97 in. or better. And in any of cases above cited the pits will vary little (if any) in size. This means that to get the same amount of peach meat we would have to grow of $1\frac{1}{2}$ in. sizes 2.3 peaches to one of 2 in. in diameter, or 3.2 peaches of the smallest size to equal the $2\frac{1}{4}$ in. peach; and remember that in each of the sizes the pit and cost to the tree and land in production remains constant

for the individual seed. If then by judicious thinning we can bring our trees to bear fewer peaches, but larger sizes, we are then engaging in a good business practice. We are at least lowering the cost of production to our trees and land. Fruit-growing is not the strain that seed-growing is. The principles above enunciated apply to all fruits in full force, and should be considered by the grower. Further, we know the size affects very materially indeed the sales end of this fruit-growing business. The small sizes are difficult and frequently impossible to dispose of, while, if there is any market at all, the proper commercial sizes are in full demand. Thinning carefully and well done, therefore, helps at both ends of the line: it lessens cost of production and renders easier the sales end of the proposition.

There is no general rule that can be laid down to cover this matter of thinning. Each tree is an individual and must be treated and studied as such; indeed, one part of the tree may, and frequently does, demand that more fruit should be removed than does another part of the tree. A rule that is frequently given, and that is yet subject to modification, is that the fruits should be so removed that they occur in the end not less than 5 in. apart. Yet it will not do to follow this rule too closely—modify it to meet the individual case. Remember, however, that the tree's tendency usually is to overbear, and that by correcting this tendency good results will be obtained.—*California Exchange*.



THE USE OF THE SUB-PACKER.

[Extracted from *Campbell's Scientific Farmer*, May, 1910.]

"A tract of ground that was in corn and maize last year was double-diced last autumn, again in February this year, thus leaving 3 in. loose, dry mulch. The soil beneath, however, was very moist, carrying all the moisture it could hold to a depth of about 3 ft. A piece of ground intended for corn was finally decided to be unsuitable, and as there was nothing else to resort to we decided to try this piece. The general conditions being very dry, instructions were given to plough 8 in. deep, thus turning 5 in. of moist soil on top of the 3 in. of dry mulch that went to the bottom. The sub-surface packer was well weighted and used two times, keeping close to the plough, then harrowed two times with the Acme harrow. On the second

day after this work was done this dry soil in the bottom was found to be quite moist. On March 31st, the third day after ploughing, this piece was planted to corn, and on the 7th April this corn was reported coming up fine, and still the weather continued dry and windy. The success of this planting and germination lies entirely in the quick and the persistent use of the sub-surface packer. The point we wish to bring out is that too little attention is given by the average farmer to the thorough fitting up of the seed and root bed. Had not thorough persistent effort been put forth to firm this under portion the corn could not and would not have germinated until a good deal of heavy rain had come. A further advantage of this fine, firm rootbed will be found in a rapid early development of a perfect root system.

"But the query also brings out another thought. It is that many people believe the packing of the soil is useful only in the arid and semi-arid regions. Now, we have contended for many years that the methods which are best for cropping in the semi-arid regions will be found of immense advantage in the humid regions. Scientific soil-culture is not for the arid or semi-arid districts alone, but for all districts. It is a method of cultivation and crop-growing to make sure crops where conditions require the greatest care, and to increase crop-production where, under ordinary conditions, fair crops can be secured.

* * * * *

"Over 20 years ago I saw what sub-packing would do for a crop, but at that time did not pay much attention to it. The incident was in Minnesota. in an early day and before very much of the land was under cultivation. Large herds of cattle were still being raised upon the ranch. Cattle-buyers of Iowa would come up in the spring of the year and buy feeders. Two brothers came up one spring and made their headquarters on my place because I had a very large and well-fenced barnyard. In a little while the two men had brought up 700 head of cattle. About the first half of May these 700 head were driven across a strip of barley twice each day to and from the ranch. Everybody thought the barley would die of such abuse, and the stockbuyers paid seven dollars for the supposed damage to the crop. When the grain ripened I cut the whole field and threshed it, so I had no way of knowing how much the tramped portion yielded, but the whole field averaged 65 bush. to the acre, and the tramped portion was by far the best. At the time I did not think of packing the ground when ploughing, but I always let the cattle run on the small grain in spring when the ground was dry and firm."

IRRIGATION OF LUCERNE.

(Continued from page 148 of September issue)

In the Modesto and Turlock irrigation districts the surface of the land under ditch slopes about 5ft. to the mile, and is too uneven to be irrigated without being levelled first. The unevenness consists in swales, hog-wallows, and mounds. The land is surveyed first either by an engineer or by the owner. In the latter case use is made of a carpenter's level, with peep sights, mounted on a tripod (Fig. 5). The long side of each check should be on the flat slope

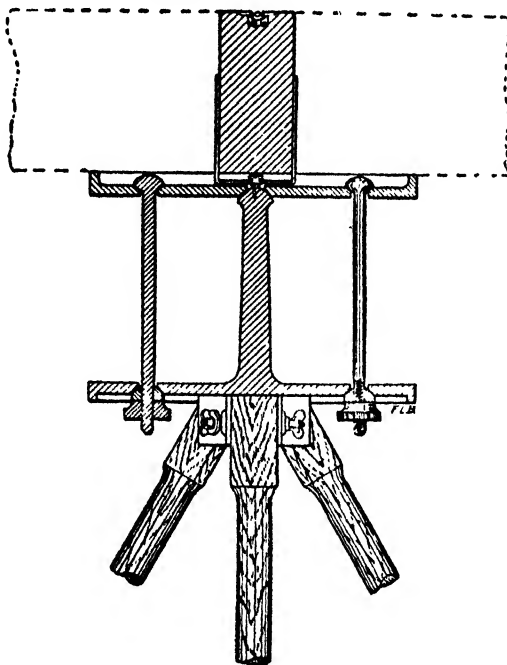


FIG. 5.—CARPENTER'S SPIRIT LEVEL ATTACHED TO A TRIPOD.

and the short side on the steep slope. A fall of 3in. to 5in. between adjacent checks is preferable to either more or less. Usually the width of checks can be so adjusted as to permit of this difference in elevation. The length of each rectangle will depend on the slope in that direction as well as the location of the supply ditches. The field should be laid out in such a way that the levees may be built with the least handling of dirt. Rectangular checks

possess many advantages over irregular contour checks, but if much of the better quality of surface soil has to be removed in order to build the former the advantages may be more than outweighed by the damage caused by grading and the extra cost.

Fig. 6 shows in outline the rectangular checks, supply ditches, and check boxes on the farm of T. K. Beard, east of Modesto, Cal. Mr. Beard ploughs the land in the early spring to a depth of 6 in. with a four-gang plough. During

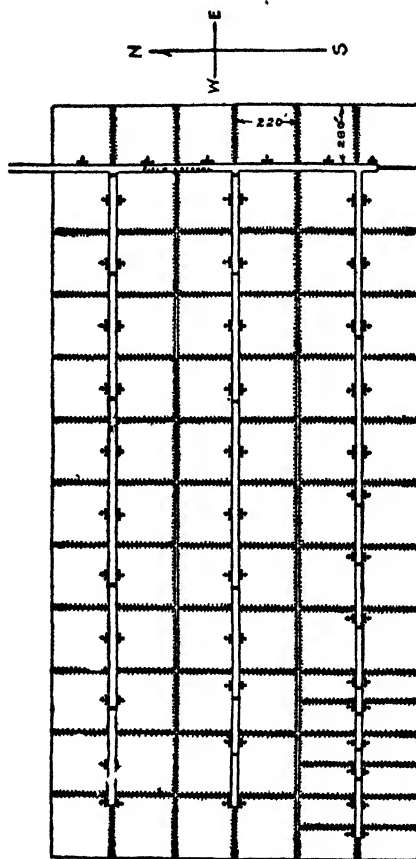


FIG. 6.—LAYING OUT RECTANGULAR CHECKS ON FARM OF T. K. BEARD, MODESTO, CAL.

the summer the checks and ditches are built in a sort of rough way, no effort being made to level the floor of the checks or to smooth the levees and ditch banks. It is then heavily irrigated, and after the soil is sufficiently dry the floor of each check is carefully levelled and the levees trimmed and smoothed. For the latter purpose the grader shown in Fig. 7 is preferred. One passage of this grader across the top of each levee and once along each

side reduces the levee to a base of 14ft., and a height of 8in. on the high side and 10in. on the low side.

On the west side of the San Joaquin Valley the land to be seeded to lucerne is almost invariably formed into contour checks. A common arrangement is that shown in Fig. 8. Here the supply ditches are intended to be about 600ft. apart, and levees are built midway between. The sides of the checks conform in a measure, but not exactly, to the natural contours, having a difference in elevation of 0.3ft. to 0.4ft. The average area of a check is half an acre. In 1908 prices were obtained on the cost of preparing land in contour checks and seeding to lucerne. The average cost on 2,067 acres of comparatively smooth grain land was £2 6s. per acre. Across the river in Modesto and Turlock districts, where rectangular checking is more common and where the natural surface is more uneven, the cost was estimated at £3 10s. for contour checks and £3 16s. for rectangular checks. These latter figures included ditching, but excluded the cost of seed and seeding.

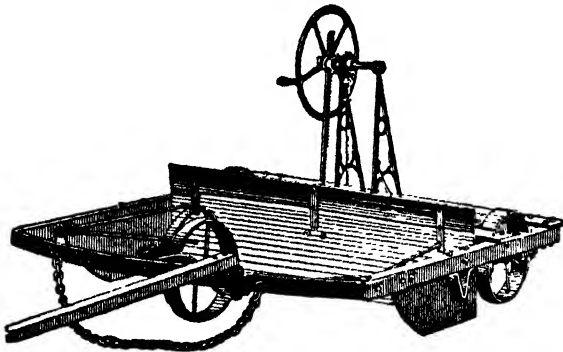


FIG. 7.—GRADER.

In the Modesto and Turlock irrigation districts the feed ditches are designed to carry large heads of 10 cub. ft. to 20 cub. ft. per second. These large heads are used by the farmers in turn for short periods of time, depending upon the acreage served. In the smaller checks a head of 5 cub. ft. per second will suffice, and if 20 cub. ft. per second are available four checks may be irrigated simultaneously. This head flowing on a check containing one acre would cover it to a depth of about 5in. in one hour. A part of the water so applied is always lost by evaporation, but the balance percolates into the soil to furnish moisture to the plants. The skilful irrigator begins with the highest checks and works down for the reason that all waters which escape through the gopher holes or broken levees may be then applied to dry checks. To reverse this rule might result in over-irrigating the lower checks. The average cost of irrigating for the season where proper check boxes are inserted is about 2s. 6d. an acre.

On the west side of the San Joaquin River each of the irregular compartments contains one to three acres, averaging about two acres. Few permanent wooden check boxes are used. The water is checked up by dams of coarse manure, and an opening is made in the levee bank with a shovel to admit the water. The lack of suitable boxes to control the water passing from the feed ditch into each check and the use of smaller heads greatly increase the cost of irrigating over that of the Modesto and Turlock districts. In the latter the cost for the season was estimated at 2s. 6d. per acre, while in the former the estimate is 3s. 9d. for each watering.

The chief advantage of the check method is that one man can attend to a large volume of water and can irrigate 7 to 15 acres in 10 hours,

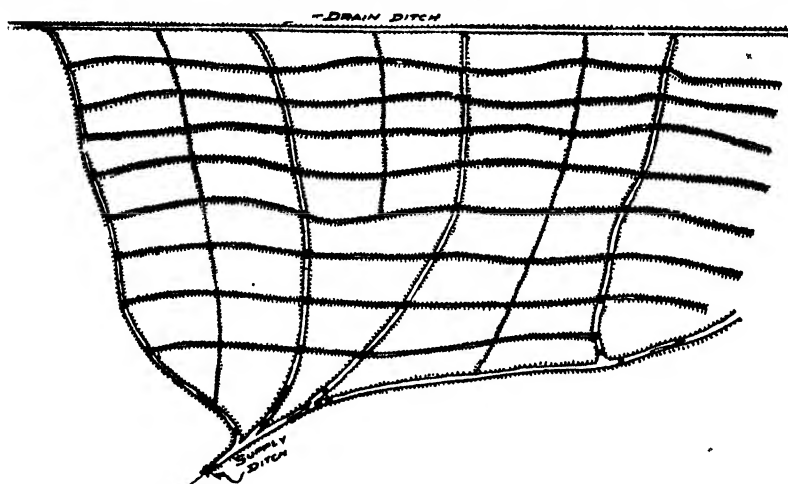


FIG. 8.—LAYING OUT CONTOUR CHECKS.

making the cost of applying water less than by any other method except the border method. To counterbalance this important gain, there are several disadvantages which western farmers ought to consider. These are the removal of a considerable quantity of surface soil to form the levees, which frequently decreases the yield on the graded spots; the extra cost of preparing the land; the damage done to farm implements in crossing levees; and the fact that this method is not well adapted to a rotation of crops.

THE FLOODING METHOD.

Flooding from field ditches or laterals is still the most common method of applying water to the arid lands of western America. In the States of Colorado, Montana, Wyoming, Utah, and to a large extent in Idaho, lucerne, clover, native meadows, and grain are irrigated in this way. This manner of wetting dry soil originated, it is believed, in the mountain States, and the

past half century has witnessed a gradual evolution of this plan, so that now it has not only become firmly established, but is regarded as the best suited to the conditions under which it is practised. It can be profitably used on slopes that are too steep for other methods. Fields having a firm soil and a fall of 25ft. to 100ft. have been flooded successfully. From this extreme the slope may diminish to less than 0.1ft. in 100ft. Its cheapness is another feature which recommends it to the farmer of limited means. Ordinary raw land can be prepared for flooding at an expense of 8s. to £1 per acre. Again, it is adapted to the use of small water supplies. In the mountain States the irrigation systems have been planned and built to deliver water in comparatively small streams for use in flooding or in furrows, and water users should be certain that the larger volumes required for checks and borders can be secured before going to the expense of preparing their fields for either of those systems.

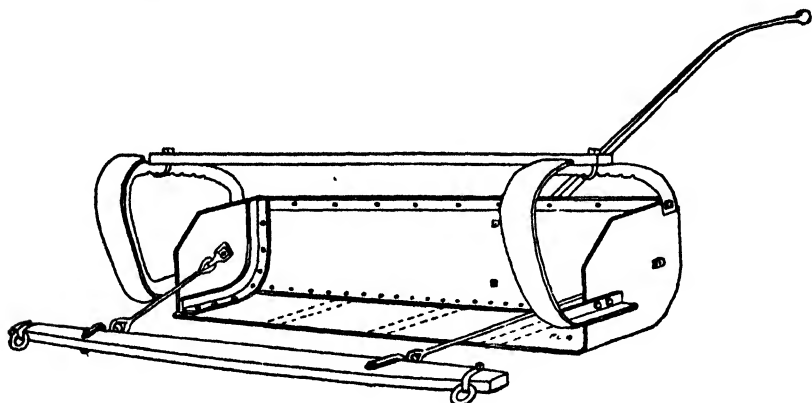


FIG. 9.—SCRAPER.

In grading the land for this particular method it is not customary to make many changes in the natural surface. Only the smaller knolls are removed and deposited in the low places. An effort is made always, however, to make the farm laterals fit into the natural slope and configuration of the tract to be watered so as to bring the water to the high places. On steep slopes the laterals may be less than 50ft. apart; on flatter slopes they may be 200ft. or more apart. Whatever the spacing it is always desirable to have the slope between them as nearly uniform as possible. When the land in its natural state is uneven the grading can be done best by a grader of the kind shown in Fig. 7, or a scraper of the kind shown in Fig. 9. When these are used it is often advantageous to make use of some such implement as the grader shown in Fig. 10 for the final smoothing and grading. If the field in its natural state is comparatively smooth and level a home-made drag or leveller, as shown in Fig. 11, serves the purpose fairly well.

The distribution of the ditches on the field varies too widely to admit of presenting a standard plan, but Fig. 12 shows an arrangement of field laterals common to the mountain States. A supply ditch, AB, is built on one side and laterals, CD and EF, branch out from it on a grade of $\frac{1}{2}$ in. to

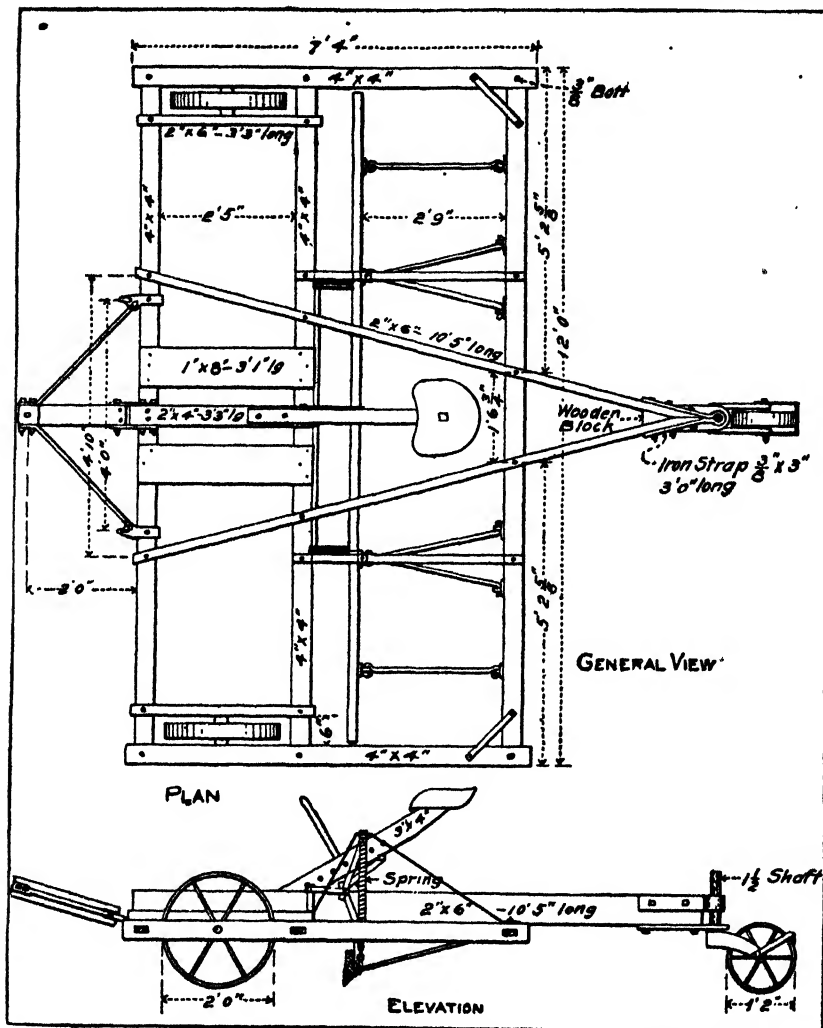


FIG. 10.—LEVELLER USED IN GALLATIN VALLEY, MONTANA.

$\frac{1}{2}$ in. to the rod. These laterals are spaced 75ft. to 100ft. apart and are made with double mouldboard ploughs, either walking or sulky. Figs. 13 and 14 illustrate other common arrangements in use in northern Colorado.

In the vicinity of Fort Collins, Colo., the main lateral is built to the highest corner of the field to be irrigated and the smaller laterals extend out from it,

spaced 75ft. to 225ft. apart, the spacing depending on the slope of the ground and the coarseness of the soil. The size of the laterals is governed by the head which may be had, but on steep slopes and on soil that erodes readily small heads are best. Around Berthoud, Colo., the land is naturally of uniform, even slope, and little grading has been necessary. Heavy timber or iron drags are used to smooth the surface after ploughing so that the water will spread evenly. These are built in various ways and out of whatever material happens to be available on the farm. Worn-out steel rails, such as have been removed from a railway, are often used, two rails being fastened together about 30in. apart. A team is hitched to each end and the driver rides on the drag. Once over a field with a drag of this kind is usually sufficient to make the surface quite uniform and smooth. The proper location for field laterals is usually evident to the irrigator without the use of surveying instruments, though in fields where the fall is slight it is often necessary to have a topographical survey made and the laterals located by an engineer.

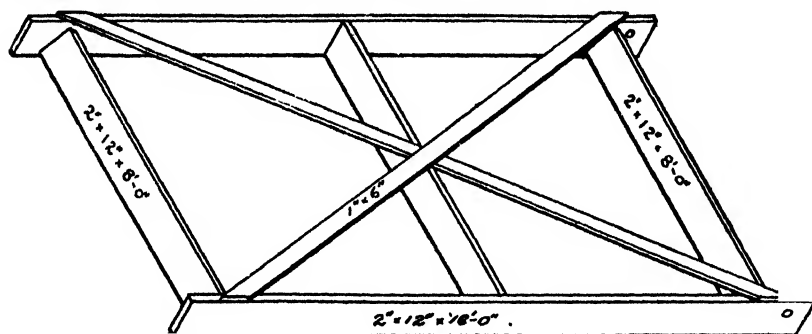


FIG. 11.—HOME-MADE DRAG OR LEVELLER.

Field laterals are always so located that they cover the highest parts of the field and their distance apart in lucerne varies from 10 rods to 20 rods.

The head required for flooding from field laterals in northern Colorado varies from 2 cub. ft. to 3 cub. ft. per second and is divided between two or three laterals. Canvas or coarse manure dams are used to check the water in the laterals and to force it out over the banks and down the slopes of the fields. In less than three hours the upper foot of soil is usually thoroughly moistened. To apply one watering in this way costs from 7d. to 1s. 3d. an acre.

In flooding clover and lucerne fields in Montana the field ditches usually run across the field on a grade of 0.5in. to 0.75in. to the rod. (See Fig. 12.) The spacing between ditches varies with the slopes, the smoothness of the surface, and the volume of water, but 80ft. is about an average. The head used is seldom less than $1\frac{1}{2}$ cub. ft. or more than 4 cub. ft. per second, the larger heads being divided between two or three ditches. In irrigating a canvas

dam is first inserted in each ditch or set of ditches, 75ft. to 100ft. below the head. The water is then turned into each channel and flows as far as the canvas dam, by which it is checked, and as a consequence rises and flows over the low places of the lower bank or through openings made with the

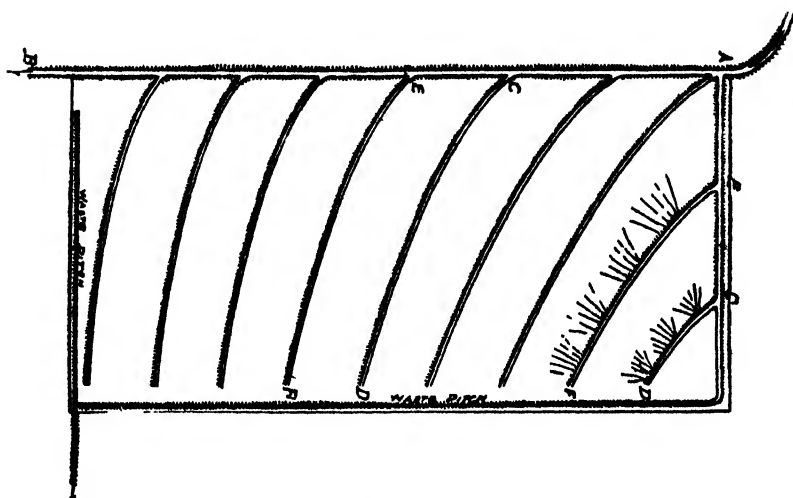


FIG. 12.—PREPARING LAND FOR FLOODING IN MONTANA.

shovel. When these small tracts have been watered, the canvas dam is raised, dragged down the lateral 75ft. to 100ft., and again inserted in the channel to serve the next tract. Manure dams sometimes take the place of the movable canvas dams. Some time before a field is to be irrigated and after the ditching is done coarse manure is placed in small heaps within each ditch channel at suitable intervals and each heap is covered with earth

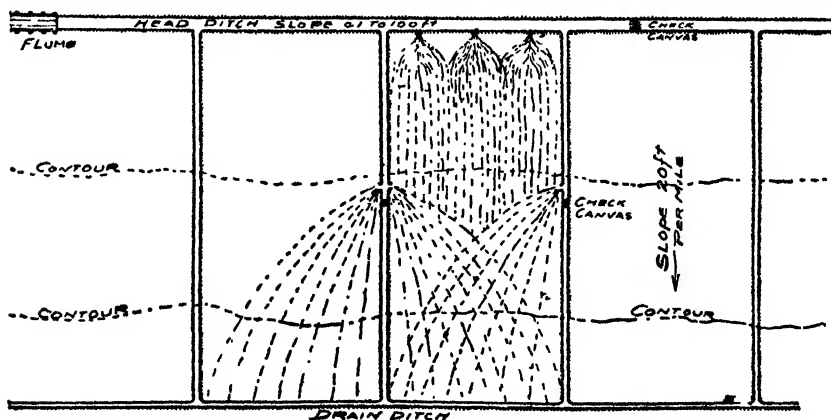


FIG. 13.—FLOODING FROM HEAD DITCHES IN NORTHERN COLORADO.

on its upper face to a depth of 1in. to 2in. When this check has served its purpose it is broken and the water flows down until stopped by the next check. In some instances permanent wooden check boxes are inserted in each lateral, while in others the canvas dam is used. The thorough irrigation of four acres is considered a good 12 hours' work for one man. By the use of 100 miner's inches two men can irrigate 7 to 10 acres in 24 hours at a cost of 1s. 10d. to 2s. 9d. per acre.

In the Salt Lake Basin the heads of water used by the irrigators of lucerne vary considerably with the flow of the streams. In spring heads of 4 cub. ft. to 6 cub. ft. per second are common, while later in the season when the streams

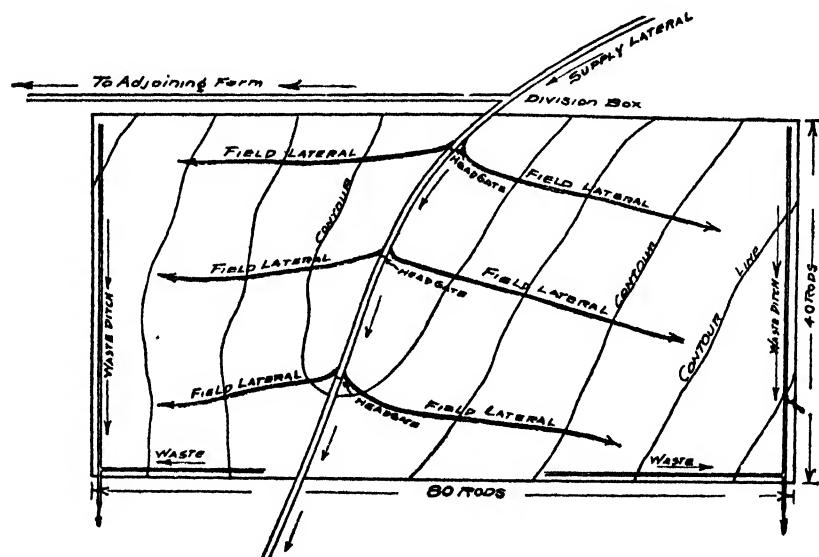


FIG. 14.—A 20-ACRE LUCERNE FIELD NEAR BERTHOUD, COLO., SHOWING SUPPLY LATERAL, FIELD LATERALS, CONTOURS, AND WASTE DITCHES.

are low they are reduced to 1 cub. ft. to 3 cub. ft. per second. A field is usually divided into strips 200ft. to 500ft. wide by laterals extending across it (Fig. 12). A permanent wooden check box or a canvas dam is inserted in the main supply ditch below each cross ditch, causing the water to flow into the cross ditch. From there it is spread over the surface through small openings in the ditch bank and any excess water is caught up by the next lower ditch. In this way each ditch serves a double purpose, acting as a drainage channel for the land above it and as a supply channel for the land below it.

In summarising the advantages of the flooding method it may be said that in first cost it is one of the cheapest, it is adapted to the delivery of small volumes of water (50 to 100 miner's inches) in continuous streams, it is particularly well adapted to forage and cereal crops of all kinds. the top

soil is not removed from the high places to fill up the low places, and firm soil, although it be on steep and irregular hillsides, can be successfully watered.

The chief disadvantages consist in the fatiguing labor required to handle the water, the small area which one man can irrigate in a day, the difficulty in applying water after dark, and the unequal distribution of water on the field unless more than the average care is exercised.

THE FURROW METHOD.

Lucerne, native meadows, and grain are most commonly irrigated by one of the methods previously described rather than by the furrow method, which is the usual method of irrigating orchards, gardens, root crops, and vegetables. The irrigating of lucerne from furrows is at present confined to the Yakima Valley, Washington, to portions of the Snake River Valley in southern Idaho, and to comparatively small areas in other States. In the localities named the soil is a fine clay loam which runs together, puddles when wet, and bakes and cracks when dry. Flooding the surface by any of the customary methods tends to puddle the top layer of soil, which becomes quite hard when the moisture is evaporated. The puddling and baking processes injure lucerne, and it was with the object of keeping as much as possible of the surface dry that furrows were introduced. When a small stream is permitted to run in the bottom of a furrow for several hours the soil beneath and for some distance on each side becomes wet, while the surface may remain nearly dry. This is shown in Fig. 15, which gives the area wetted from a furrow 5 in. deep in seven hours as determined in one of the orange orchards of southern California.

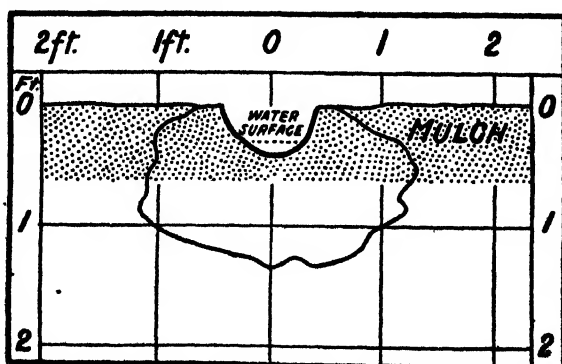


FIG. 15.—OUTLINES OF PERCOLATION FROM FURROW FIVE INCHES DEEP IN SEVEN HOURS.

(To be continued.)

BUSH FIRES AND BUSH FIRE BRIGADES.*

By T. S. MARSHALL, Chief Officer, Country Fire Brigades of Victoria.

The question of bush fires is of such serious import to the dwellers in the forest districts of the Commonwealth of Australia, as also to the large and increasing numbers of people who make their living by agricultural and pastoral pursuits, that this must be my apology for attempting to compile a paper on the subject.

Bush Fires.—Dwellers in our cities know but little of the terrible character of such visitations. No more appalling sight can be imagined than an extensive forest fire, and there is no more terrible and heartbreaking work than fighting one. Each individual working desparately, wet through with sweat, but with throat parched, gasping for breath, and head splitting with the dreadful heat, has been well described as the normal condition of men who work those fires.

Right throughout Australia are to be found millions of acres of forest country in which many of the trees are ringbarked, others hollow to the core; numberless dead trees lying on the ground inflammable as tinder; thick grass and undergrowth as dry as bonedust everywhere. Once such country becomes alight hardly any power on earth can stop it. By daytime the sight is an appalling one, but it is at night that the spectacle becomes awe-inspiring—gigantic trees, burning like matchwood, breeding immense flames, which carry onward from tree to tree the fire on its invincible course, shedding a lurid glare over the whole countryside; the continuous smashing and crashing of falling trees resembles the heavy cannonade of opposing armies, while the wind carries along leaves and burning bark to set fire to trees and undergrowth hitherto untouched, and so the fire goes on. To confine such fires to the forest is the work set the fire-fighters, for once these fires get out it means ruin to hundreds of families; their homesteads, stacks, crops, grass, and fences are swept away; while horses, cattle, and sheep perish by the thousands. When we know that such fires are of frequent occurrence throughout Australia, surely it behoves this Conference, by instruction or otherwise, and fortified by the experience and the knowledge of men who have been brought in close contact with such dire disasters, to mitigate, as far as possible, the hardships endured through the ordinary methods of attacking bush fires.

* Paper read at Conference of Fire Brigades Boards, Melbourne.

Causes of Outbreaks.—The most common causes of grass fire outbreaks are the negligent use of wax matches; fires lit and left smouldering by swagmen, hawkers, picnic parties, and fishermen; boys burning out rabbits from burrows; settlers burning off timber or stubble; and sparks from locomotives, traction and portable engines. In forest fires the principal cause is the negligence of timber splitters in leaving their camp fire burning or the saw millers burning off the fallen tree tops, without authority, in the wrong season.

Precautions.—(1) During the *hot months of the year the sale of wax matches should be prohibited in the districts subject to bush or grass fires*; indeed, *if their sale were prohibited altogether it would be preferable*. These matches used negligently, it is well known, have been responsible for many disastrous fires.

(2) The average swaggie is not usually a careful man, and he and the others enumerated above should be prevented from *lighting fires in the open during the hot season*, especially in the settled districts. The punishment for lighting, and especially for *leaving fires smouldering*, should be heavy and salutary.

(3) Burning off timber and stubble is a fruitful source of fires. In all cases of burning off notice of intention to do so should be given to the local authorities; as also to fire brigades in the neighborhood; and, above all, to the immediate neighbors, so that they may be satisfied that proper precautions are being taken against the spread of fire, and also to give them a chance to take their own measures for self-protection. Much mischief is caused by this neglect to give notice. The season for burning off varies, of course, according to the climatic conditions and character of the country. Taking it all round, it should be prohibited in Victoria from November 1st to the 31st March, and the burning off should be done only when proper precautions are taken against the fire spreading.

(4) Traction and portable engines working in the agricultural and pastoral districts should be fitted with spark arresters; otherwise they are most dangerous. A man should walk some distance behind when these machines are at work to guard against fire.

(5) Phosphorus improperly mixed with pollard, &c., by incompetent persons, generally for cheapness, is alleged to be responsible for some fires. If that be the case, only authorised persons should be allowed to mix it, and only authorised persons be permitted to sell it.

(6) Forest fires do an immense deal of damage by the burning of valuable timber and young trees, and, notwithstanding that permits granted to men working in the forest are stringent enough, the negligence still goes on. One clause reads thus—"Fires shall not be permitted within the forest between December 1st and February 28th, except special precautions are taken in lighting such fires in a bare space 20ft. in diameter, and in a hole

dug for the purpose. The burning off of debris, as also standing trees or fallen logs, during the period specified above is strictly prohibited. Small wood only to be used, and every fire to be carefully extinguished by being covered with earth or being put out with water, under the penalty of the permit being cancelled and loss of work." A much more severe penalty should be exacted, as it is almost hopeless to put a fire out once it gets a hold in heavily timbered country, particularly in stringybark country, and where a heavy wind is blowing. Foresters, for prevention sake, should see that the tops of sawmill trees, trees cut down for mining timber, for fencing, and for poles are burnt up as soon as they are fit to be burned. Some timber will smoulder for weeks, the worst being grey box ; in such cases they are a menace, and every care should be taken to extinguish the fire. According to the Chief Inspector of Forests, the woodland area of Victoria is 12,000,000 acres, and, besides this, there is a great quantity of land set apart as timber reserves. This large area requires more constant supervision apparently than the Government now gives it, the forestry staff numbering only about 50 men. To keep a forest fire within bounds, wide breaks around the forest are absolutely necessary, and to stop fires inside advantage must be taken of all fairly clear places to form breaks, especially at right angles to the prevailing winds, and also to block the lateral spread of the fire by working from each flank to a point. As a prevention, these breaks should be previously specially prepared in suitable seasons, after the forest has been systematically divided. In case of an outbreak in thick bush country, and when the fire comes down in a body, it is no use trying to fight it ; go ahead and try to find a clear place, and make a break ; but for such work a large number of men is required, as it is necessary to make these breaks at least five or six chains wide.

FIRE BREAKS.

For prevention against grass or crop fires, fire breaks are prepared in various ways :—

1. By ploughing one, two, and sometimes more chains wide round the property. This is perhaps the most effective of all breaks, although it is contended by some that in the wider breaks too much land is laid waste. A friend of mine in New South Wales uses the widest breaks, his argument being that it is better to lose that much land than to lose the whole of one's property, and he emphasizes this by the fact that, while fires have raged round his land and caused disaster to his neighbors' places, not once has a fire entered any portion of his property.

2. Plough five or six furrows wide, and one or more chains away plough a similar number of furrows parallel with the first set, and burn the intervening space when the grass is dry enough.

3. With a cart, having a tank of water, with pump and spray, damp the ground about 8ft. or 10ft. wide for the length required, and a chain or two away damp the same width and burn, as in clause 2. It is wonderful how little water is required to form such a break, and how effective the sprayer is. An ordinary watering-can run along the grass in case of fire is more effective than half a dozen buckets of water thrown bodily at it.

4. Main and other roads are splendid breaks, but to make them thoroughly effective they must be kept free of grass and clear of fallen timber.

5. Stone walls make a good break, as they stop the advance of the fire sufficiently long to give the beaters a chance.

HOMESTEADS.

Besides burning or ploughing breaks to prevent the destruction on large areas, it is absolutely necessary that homesteads and their necessary out-buildings should be made secure by breaks.

STACKS.

Stacks should be placed at distances so far apart from each other as to admit of an effective break being made between, and, in case of fire, to allow room to work; these breaks being, of course, prepared beforehand. Building stacks close to each other is most dangerous, for, should one be set on fire, the whole lot is almost sure to go.

BUSH FIRE BRIGADES.

Of recent years bush fire brigades have sprung up mushroom-like in almost every part of Victoria, and they have come to stay. They are for the most part formed by farmers and farmers' sons for mutual protection; all are worked voluntarily, the entire expense of organisation, equipment, and working being defrayed by the members and the landholders. The contributions to the fund are generally based on the acreage, and range from 2s. 6d. for a small landholder, to £5 or more, for the bigger holders. The only trouble is that you will always find the man who will not pay, although he receives equal benefits with those who do contribute; but, on the whole, there are very few landholders who do not contribute. The establishment of these brigades should not only act as a deterrent against carelessness or worse, but be the means of saving much valuable property every year.

OFFICERS.

These brigades, to be effective, must be under some recognised authority or control. The captain, who must be a mounted man, as he is then, if he be a good general, worth 20 men. He should have full knowledge of the district; should have the confidence of the men working under him; be a sharp, clear-headed man, and be able to adapt himself quickly to the varied conditions inseparable from a bush fire, change of wind especially. With

two or three smart lieutenants under him, also on horseback for preference, each in charge of a section of men, and with suitable equipment, valuable work can be done.

POWERS OF OFFICERS.

The officer in charge at a fire, to prevent its spread, should have power to enter upon private property, cut down fences if necessary, burn breaks, and he should be indemnified against any action that may be taken against him. As the law at present stands, no one can legally enter another man's property in case of fire to stop its spread without first having obtained the consent of the owner. In such circumstances owners have occasionally refused entrance to the workers, generally to their disadvantage. In one authenticated case fires were raging round this man's property; those working asked to be allowed to cross his fence to burn a fire break, but the request was refused. In the morning permission was granted, but it was then too late, as a fierce wind had arisen, and the flames swept over his property and wiped it out.

EQUIPMENT.

The equipment necessary to fight a bush fire is a fire cart with tank, pump, and hose, leather or basil beaters, rakes, axes, and wire cutters. One bush fire cart that I have seen and tested is made by Cutter, of Ballarat. It has a semi-rotary pump, worked by hand, attached to a hundred-gallon tank mounted on a strong yet light carriage, capable of being drawn by one horse, or two, if necessary, at a good rate, even over rough country, and wherever a dray can go. It takes four men to work it—one to drive, one to pump, and two to manipulate the hose. The tank, by means of its suction, can be filled from a waterhole or dam, or by hand by buckets, the latter process being quicker. A jet through a $\frac{1}{2}$ in. nozzle can be thrown 20ft. A sprayer can take the place of the nozzle, and with it a hundred gallons of water will spray 8ft. to 10ft. wide along a distance of over two miles. For the purpose of making firebreaks, putting out fires on logs, and saving fences, this or other like carts are most valuable. About 50 of the Ballarat carts are now in use in Victoria, as well as a few in New South Wales, and they have been found to be most effective. Mr. Turner, manager of Admiral Bridges' station at Trawalla, informs me that they have three of these carts on the property, and he adds that unless the day is very bad indeed the sprayer can put out fires two or three miles with 100galls. of water, and that they are of the greatest use, especially in burning fire breaks and in the case of bush fires. There are other makers in Victoria, but I have not seen their carts, although I am given to understand that they also are very efficient. In some cases ordinary drays carrying 200-gall. tanks of water follow on after the fire carts to replenish their tanks if necessary.

FIRE BEATERS.

The best fire beater for clear country is one made of good tanned leather 12in. x 8in., firmly secured to a strong but light handle. I submitted one of these, made at Linton, to the Bush Fires Committee, which met in Victoria three years ago, and it was adopted by them. These beaters are a long way ahead of bags or boughs; far more ground can be covered quickly, and with much less fatigue to the worker. Basil beaters are more useful than the flat beater in stony or timber country in putting out fire in the interstices.

RAKES.

Light rakes in conjunction with these beaters as the flame are knocked down are most useful in raking in the embers. A piece of angle iron attached to the top of the rake is useful in chopping away burning tufts of grass or small roots. One man with the flat beater can keep three or four men with rakes going.

AREA OF BUSH FIRE BRIGADES.

An area having a radius of from eight to 12 miles, according to the nature of the country, is quite enough for a bush brigade to control. Two or three fire carts, with beaters, rakes, and other requisites, should be placed at convenient spots in each brigade's territory, always ready to be taken to a fire promptly. In the event of a large and serious fire assistance could be readily obtained from neighboring bush brigades.

MEANS OF ALARM.

In some places during the bush fire season men are stationed on the highest ground to give early warning of an outbreak by galloping to the homestead or nearest depot. On many stations telephones are now in use, and in a short space of time, by their aid, men can be summoned to the scene of the outbreak. Messengers on horseback and on bicycles are frequently used to give the alarm; and, as this is the age of motors, these could with advantage be utilised for the same purpose; indeed, in the near future, the aeroplane may become an important factor in locating these fires.

AT A FIRE.

On the alarm being given, the bush fire cart is taken to the scene of the outbreak, with sufficient men to work it, followed at once by men in a conveyance carrying a large number of beaters and rakes, each man being provided with a water bottle or bag. Another conveyance follows on with demijohns of water and food, usually bread and cheese; no beer is allowed, but a little whisky and water as a reviver. Ladies, as a rule, look after the refreshments. The men having beaters are at once distributed at convenient distances along the face and on the flanks of the fire, each beater being assisted by men with rakes. The great point in bush fire fighting

is to endeavor to decrease the front of the fire by working from a flank to a point. The fire cart is here exceedingly useful, by spraying along the face at the worst parts, and so assisting the beaters materially by delaying the advance of the fire. In such cases the cart is worth 20 men. Should a strong wind be blowing, the fire advances so quickly as to make the work dangerous and arduous in the extreme. If the fire is likely to beat the workers, it is well to go some distance ahead of it—several hundred yards may be necessary—run the cart with sprinkler along the grass parallel with the fire, and light the intervening space between the damp grass and the fire. Notwithstanding the wind, the dry grass will burn back and meet the advancing fire, and so make a break and an effective stop. Two or three carts in such cases spraying, will, of a certainty, save the most difficult situation. It is the duty of the fire-beaters, however, to see that the fire does not cross the sprayed part and cause a renewal of the outbreak.

LEGISLATION.

The only Australian State, to my knowledge, that has an effective Act on this subject is South Australia. In their Bush Fires Act of 1885 the restrictions as to lighting fires in the open, negligence in burning off, and the careless use of fire generally, are very stringent; while the penalties imposed for breaches of the Act are fairly severe, the fines ranging from £5 to £50. The application of an Act of this character, made general to suit the special requirements of each State, would be a step in advance. As previously stated, a Parliamentary Committee, three years since, took evidence throughout Victoria on this important question. All sorts and conditions of men were invited to give evidence before this Committee, and much valuable information on almost every phase of bush fires was tendered, but the labors of the Committee appeared to end with the taking of evidence, as no report from them, as far as I know, has ever been submitted to Parliament.

Seeing that bush and grass fires are always with us during the hot season, I hope that this Conference will mark its sense of the necessity for legislation on the subject by urging upon the States of the Commonwealth that have not already done so to pass a short Act dealing with these important matters, and any others bearing on the question that have not been touched upon in this paper.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, September 7th, there being present Messrs. J. W. Sandford (chairman), C. J. Valentine, A. M. Dawkins, J. Miller, W. H. Gillard, W. J. Colebatch, B.Sc. (Agric.), Chas. Willcox, G. R. Laffer, and Col. Rowell, C.B.

The following report of the committee appointed to consider Mr. Colebatch's suggestions for the establishment of veterinary scholarships submitted the following report :—" On the general question we are unanimously of opinion that the South Australian Government will be acting in the interests of this State and of the whole Commonwealth by recognising and supporting the veterinary departments which have already been established in connection with the Melbourne and Sydney Universities. We have not come to this conclusion without giving full consideration to the feasibility of establishing a veterinary college in this State, but we feel assured that any scheme which aims at the upbuilding of a veterinary educational institute for the purpose of training young men and equipping them with a university degree, diploma, or licence in veterinary science is at the present junction indefensible. With regard to veterinary scholarships we have to say that we have considered the proposals brought forward by Mr. Colebatch, and whilst we would recommend the adoption of the principles he has outlined, we consider that the details may be advantageously amended on the lines indicated. We suggest that the Government offer one veterinary scholarship annually of the value of £80 per annum, tenable for five years at the Universities of Melbourne or Sydney on the following terms :—1. That the competitors must be not less than 17 years of age, and must have been residents in the State of South Australia for a period of not less than five years. 2. Candidates must have matriculated in Adelaide, Melbourne, or Sydney, or at some other approved university, and they must be eligible for admittance for the degree course in veterinary science at either the Melbourne or Sydney University. 3. That a board of examiners be appointed each year to hold the scholarship examination, and that the examination be framed to test the competitors on general stock knowledge, and shall cover (1) written papers, (2) oral test, (3) practical work. Each holder of scholarship shall take out a first class life policy in an approved company to the amount of £400, the premium to be deducted from the annual payment of the £80, and the policy to remain the property of the Government until the termination of the agreement. Each successful competitor to enter into a written agreement that he will pursue the course

during the currency of the scholarship, and place his services at the disposal of the Government in terms of the next clause. Each holder of the scholarship on graduating may be required to serve in the South Australian Stock Department for a period not exceeding two years, at a salary of not less than £100 per annum."

On the motion of Col. Rowell it was resolved that the report be adopted and be submitted to the Hon. the Minister of Agriculture, recommending that action be taken to establish a veterinary scholarship on the lines suggested. A vote of thanks was accorded to the committee.

Woodside Branch intimated that the Annual Conference of Hills Branches would be held at Woodside on October 19th.

Approval was given to the formation of Branch at Willowie, with following gentlemen as members:—Messrs. D. McCallum, W. J. Martin, A. S. Stone, E. A. Staude, W. P. Foulis, J. Stone, L. McCallum, B. E. Schmidt, J. J. Richards, S. C. Greig, T. Hawke, S. G. McGilchrist, A. W. Howard.

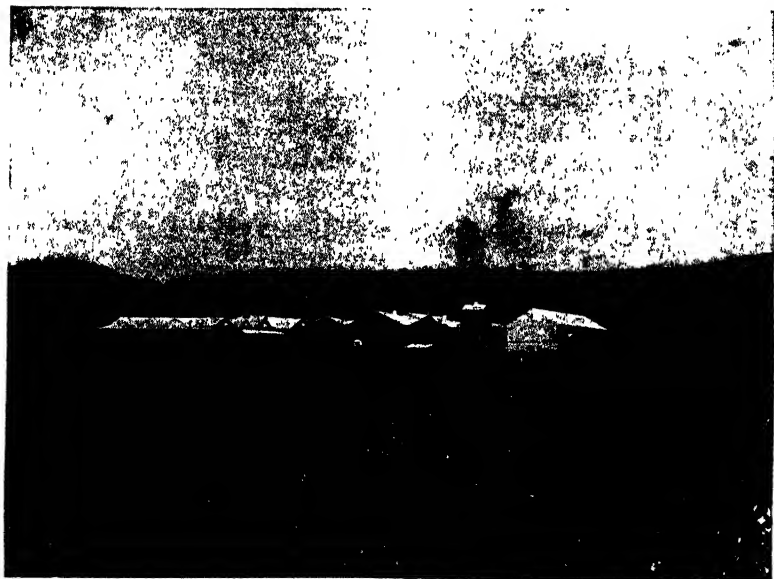
The following gentlemen were approved as members of the undermentioned Branches:—Messrs. C. Urlwin, J. Helps, W. Shepherdson, Salisbury; R. Truscott, Kadina; G. Rafferty, Morchard; H. Patterson, Murray Bridge; H. Searle, Forster; H. Beck, O. Ward, H. Baker, J. Ward, jun., H. F. Field, T. W. Sobels, A. Ward, jun., H. S. Davies, F. L. Burgess, A. S. Burgess, G. W. Picker, A. C. Sobels, A. Dunstan, Watervale; Y. V. Davey, W. Correll, Yorketown; Dr. A. E. H. Brady, Port Broughton; J. Borrett, M. Browne, Narridy; A. C. Branson, C. W. Cant, Stockport; G. Heusler, Sutherlands; A. H. A. Marshall, Morgan; W. Giles, Angaston; H. Dunn, L. Wheeler, F. Beinke, W. Spence, J. McCallum, H. Kernick, Elbow Hill; W. Canning, Coomooroo; E. J. Jericho, F. Myers, S. G. Carrick, Mitchell; J. C. Stiggants, A. F. Grad, G. H. Oats, Penong; F. Baldock, J. Lauterbach, Woodside; R. W. Taylor, A. W. Coad, C. Tiller, Meningie; C. Dare, Mount Bryan East; W. Cooper, J. Lines, W. Wurst, A. R. Clogg, A. Powell, W. Boehm, Appila-Yarrowie; R. Bull, Wilkawatt; H. C. Howard, P. S. Sinclair, W. Smith, Green Patch; T. F. Dollard, H. Voumard, Shannon; I. Teakle, H. Nancarrow, W. Robinson, Crystal Brook.

Beetaloo Valley Branch suggested that in view of the enormous losses of fruit, &c., caused by birds, the Board should ask the Government to arrange for the supply of ammunition at low cost through the Branches. It was resolved that the Board could not entertain this suggestion.

Mr. Dawkins said he would like to call attention to the value of the screech owl, or delicate owl, as a destroyer of sparrows, &c. There were a goodly number round his homestead. They nested in the hollow gum trees, and he had been astonished at the large quantity of remains of sparrows and starlings found beneath these trees. To see these owls hovering over the orange trees at night, darting in now and then to seize a sparrow or other bird, was very interesting. These owls should be afforded every protection.

Mr. Laffer said, at the conference in reference to bird pests held last year. Mr. Mellor referred to the enormous number of sparrows destroyed by these birds. The destruction of the old trees deprived them of the necessary shelter.

The members expressed pleasure at the intimation that the Government had appointed Mr. Norman Jolly, B.A., B.Sc., as Instructor in Forestry.



VINEYARD AND WINE-CELLARS.

THE WHEAT MARKET.

September was an uneventful month so far as the local wheat market quotations were concerned. Early in the month the price at Port Adelaide declined to 3s. 9d., and a few days later to 3s. 8d., and it fluctuated between those figures during the remainder of the month; forward sales of new season's wheat being made at 1d. per bushel below the price for old season's. The local fluctuations were governed almost entirely by news from London and Melbourne, and Sydney prices were similarly affected, though they were slightly better than Adelaide prices on the same date. The latest news from the Trade Commissioner is to the effect that the London market exhibits a stronger tendency.

According to *Broomhall's Corn Trade News*, which, on August 16th, published a forecast of the likely net requirements of imported wheat and flour by the principal countries for the season ending July 31st, 1911, there seems to be very little prospect of there being a plethora of wheat during the current season unless all the advices concerning the serious deficiency in the United States, Canada, and France should prove to be widely astray.

Beerbohm's Corn Trade List, on the other hand, points out on August 26th that the estimate a month before of a deficiency of 140 to 150 million bushels in the spring wheat out-turn for the United States and Canada had been reduced to a probable shortage of 90 million bushels. Russia, the paper stated, had increased its wheat area this year by nearly 5,000,000 acres; and while much of the wheat had suffered from unfavorable conditions, Russia, with the addition of large reserves of old wheat, would be able to export on a large scale all through the season. On September 2nd the same paper wrote:—"A month ago it was remarked that it was probable that the course of prices would depend principally on what quantity of wheat Russia could export, and how much France would require to import; to a great extent trade has been governed by these two factors during the past few weeks, the large shipments from Russia and the Danube being more than counteracted by the demand from France. These remarks still hold good, and while the latest advices received point to France requiring more wheat than was thought a month ago, present indications are that Russia has again reaped a very large crop, although much of it has been harvested in poor condition. The Hungarian Minister of Agriculture estimates the Russian crop at 96,000,000qrs., and, in view of the large increase in the area sown, it is quite possible that the yield is nearer 90 million than 80 million quarters; this, with the addition of the large reserves brought forward from the last crop, will enable Russia to be a big shipper again probably all through the season. Whatever may happen later on, shipments for some time to come promise to be more than ample for all current requirements."

Date	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Sept. 5	—	3/10½ to 3/11½	4/0½ to 4/1 ex store	3/10 to 3/10½
6	Steady, but quiet	3/10 to 3/11	4/1	3/10½
7	Do.	o.s. 3/10 to 3/11	4/0½ and 4/-	3/11 to 3/11½ b.
8	Sailer, 4/11½	o.s. 3/10 to 3/11; n.s. 3/9 to 3/10	4/0½	Do.
9	Dull	Do.	4/- to 4/0½	Do.
10	Quiet	o.s. 3/10; n.s. 3/9	3/11½ to 4/-	—
12	—	o.s. 3/9 to 3/10; n.s. 3/9	3/11½	3/11½
13	Quiet	o.s. 3/9; n.s. 3/8	3/11 to 3/11½	3/11 b.
14	To arrive Oct., 4/10½	o.e. 3/9; n.s. 3/8 to 3/9	3/11	3/10½ to 3/11 b.; 3/11½ s.
15	—	o.s. 3/9; n.s. 3/8	3/11	3/10½ to 3/11
16	Dull; offered lower	o.s. 3/8; n.s. 3/7	3/11	Do.
17	Unchanged	o.s. 3/8; n.s. 3/7	3/10½ to 3/11	—
19	—	o.s. 3/8; n.s. 3/7	3/10½ to 3/11	3/10 parcels
20	January, 4/7½	o.s. 3/8; n.s. 3/7	3/11 ex store	3/9 to 3/10
21	Steady	o.s. 3/8; n.s. 3/7	3/11 ex store	3/10 b.; 3/11 s.
22	Firmly held	o.s. 3/8; n.s. 3/7	3/10½ to 3/11	3/10 b.
23	Off coast, 4/9	o.s. 3/8; n.s. 3/7	3/11	3/10 b.; 3/11 s.
24	Steady, but quiet	o.s. 3/8 to 3/9; n.s. 3/7 to 3/8	3/11	—
26	—	o.s. 3/8 to 3/9; n.s. 3/7 to 3/8	3/11 to 3/11½	3/9 to 3/10 b.
27	Steady, but quiet	o.s. 3/8 to 3/9; n.s. 3/7 to 3/8	3/11	Do.
28	Dull; offered lower	o.s. 3/8 to 3/9; n.s. 3/7 to 3/8	3/11	3/9½ b.
29	Quiet; easier tendency	o.s. 3/8 to 3/9; n.s. 3/7 to 3/8	3/10½	3/9 to 3/9½ b.
30	Steady, but quiet	o.s. 3/8 to 3/9; n.s. 3/7 to 3/8	3/10 b.; 3/10½ to 3/10½ s.	3/9½ b.
Oct. 1	Dull, with easier tendency	o.s. 3/8½ to 3/9; n.s. 3/8	3/10	—
3	—	o.s. 3/9; n.s. 3/8	3/9½ to 3/10	—
4	Strong and rather dearer; good demand	o.s. 3/9; n.s. 3/8	3/9½ to 3/10	3/9 to 3/9½ b.; 3/10½ s.

STEAMER FREIGHTS.—Parcel rates during September ranged from 20/- to 22/6 per ton (6½d. per bush.) for London or Liverpool. For full cargoes rates ranged from 23/- to 24/6 per ton (7½d. to 8d. per bush.) for United Kingdom-Continent. At present the market is decidedly firm, business being done at 26/- per ton (8½d. per bush.) for October-November shipments. For new season's loading 27/6 per ton (8½d. per bush.) is quoted. Port Adelaide to Melbourne 8/- per ton (2½d. a bush.); to Sydney 10/6 per ton (3½d. a bush.).

SAILER FREIGHTS.—Business has been done for October-November loading at 23/6 per ton (7½d. per bush.) for United Kingdom-Continent. For new season's, January-February, a little business has been done at 23/9 to 24/- per ton (7½d. to 7½d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for September, 1910, at the undermentioned stations, also the average total rainfall for the first nine months in the year, and the total for the first nine months of 1910 and 1909 respectively :—

Station.	For Sept., 1910.	Av'ge. to end Sept.	To end Sept., 1910.	To end Sept., 1909.	Station.	For Sept., 1910.	Av'ge. to end Sept.	To end Sept., 1910.	To end Sept., 1909.
Adelaide	2.81	16.76	20.26	21.86	Hamley Bridge	3.14	13.12	17.45	17.19
Hawker	1.67	9.38	15.82	12.55	Kapunda	3.15	15.88	19.24	21.45
Craddock	1.59	8.40	13.07	10.67	Freeling	3.09	14.23	18.59	18.00
Wilson	1.61	9.09	15.94	11.25	Stockwell ...	2.85	16.29	17.78	19.51
Gordon	1.62	6.77	10.05	10.57	Nuriootpa...	2.80	17.11	20.62	22.58
Quorn	2.37	10.74	16.20	13.18	Angaston ...	3.11	17.47	22.32	23.49
Port Augusta.	2.93	7.10	15.80	10.85	Tanunda ...	3.39	17.85	22.27	24.06
Port Germein	4.23	9.65	18.58	13.28	Lyndoch ...	3.22	18.62	21.29	22.56
Port Pirie ...	4.70	10.13	22.49	12.00	Mallala	3.14	13.43	17.43	17.45
Crystal Brook	4.45	11.89	19.20	16.22	Roseworthy .	2.74	13.93	18.45	18.14
Pt. Broughton	3.29	11.40	17.13	14.14	Gawler	2.66	15.58	19.50	21.18
Bute	3.16	12.35	21.06	14.77	Smithfield ...	2.55	13.19	19.38	18.02
Hammond ...	3.14	8.29	16.94	12.45	Two Wells...	2.40	14.53	16.76	16.00
Bruce	2.15	6.90	15.74	9.61	Virginia.....	3.75	14.18	20.25	18.55
Wilmington .	3.51	14.12	22.86	18.22	Salisbury	2.38	14.96	20.10	19.25
Melrose	3.07	18.43	28.06	26.27	Teatree Gully	2.69	22.62	24.70	31.33
Booleroo Cntr	2.94	12.41	19.19	15.49	Magill	3.27	20.91	22.08	70.04
Wirrbarra ...	4.12	14.84	24.14	21.85	Mitcham ...	2.99	21.92	21.21	25.13
Appila	3.57	11.44	22.60	14.84	Crafers.....	5.49	38.48	43.96	55.46
Laura	5.95	13.89	25.87	21.20	Clarendon ...	4.32	33.17	28.22	35.62
Caltowie	4.13	13.28	19.67	16.00	Morphett Vale	3.41	19.18	21.34	25.10
Jamestown ...	4.14	13.50	20.78	17.18	Noarlunga...	4.08	16.71	21.01	23.31
Gladstone ...	4.79	12.26	17.51	14.56	Willunga	3.38	21.60	26.13	20.23
Georgetown .	6.78	14.46	22.30	16.15	Aldinga	3.32	16.84	20.42	23.25
Narridy	3.91	13.43	17.68	14.23	Normanville..	3.08	17.27	23.16	21.31
Redhill	4.15	13.14	23.19	17.51	Yankalilla...	3.40	18.62	31.38	22.60
Koolunga	3.77	12.32	21.54	16.34	Eudunda	3.06	13.42	25.65	14.22
Carrieton ...	2.09	9.12	18.17	12.91	Sutherlands .	1.89	—	13.95	10.38
Eurelia	2.44	10.09	17.58	12.37	Truro	3.03	15.58	21.27	21.09
Johnsburg ...	1.94	7.41	14.17	10.72	Palmer	1.90	—	17.08	14.44
Orroroo	2.28	10.47	16.81	12.64	Mt. Pleasant..	2.78	22.35	24.74	25.99
Black Rock...	2.52	9.17	17.71	12.97	Blumberg ...	2.93	24.62	25.82	28.63
Petersburg ...	2.57	9.87	15.73	12.00	Gumeracha...	3.33	27.42	29.13	38.00
Yongala	2.78	10.49	16.11	12.73	Lobethal.....	3.24	29.96	29.61	38.74
Terowie	2.95	10.22	19.01	12.05	Woodside ...	3.29	26.08	30.36	36.35
Yarcowie	3.16	10.53	20.01	13.78	Hahndorf ...	3.57	29.43	42.58	35.86
Hallett	4.16	12.80	18.08	13.07	Nairne	3.10	23.77	28.17	30.89
Mount Bryan	4.06	12.05	18.71	13.20	Mt. Barker ...	3.30	25.65	28.04	32.15
Burra	4.07	14.20	21.25	16.44	Echunga	3.86	26.97	32.37	38.76
Snowtown ...	3.54	12.54	18.85	16.12	Macclesfield..	3.27	25.09	30.96	34.31
Brinkworth...	3.83	11.67	20.19	15.01	Meadows	4.20	29.15	36.29	38.53
Blyth	3.63	12.91	18.05	18.89	Strathalbyn .	2.41	15.56	21.91	23.54
Clare	4.27	19.69	26.36	25.53	Callington...	2.01	12.86	15.71	16.69
Mintaro Cntrl.	3.70	17.75	34.04	22.82	Langhorne's B	1.84	12.29	20.60	14.38
Watervale...	4.16	22.19	25.00	28.50	Milang	1.38	13.68	12.08	16.15
Auburn	4.38	19.53	27.05	30.72	Wallaroo	2.98	11.29	16.73	15.53
Manoora	3.21	14.47	18.25	18.12	Kadina	3.01	13.13	16.74	17.32
Hoyleton	3.52	14.66	16.41	17.54	Moonta	2.36	12.44	13.86	17.72
Balaklava ...	3.14	12.68	17.33	15.74	Green's Plns..	2.90	12.80	16.63	17.38
Pt. Wakefield	2.56	10.59	14.21	12.81	Maitland....	2.88	16.58	18.06	21.70
Saddleworth	2.74	16.10	18.81	19.47	Ardrossan ...	2.91	11.35	14.32	14.41
Marrabel ...	2.76	14.34	18.71	22.51	Port Victoria	2.10	12.50	14.63	14.79
Riverton	3.33	16.47	22.93	21.93	Curramulka .	3.37	15.50	19.09	18.38
Tarlee	2.11	13.87	17.40	18.30	Minlaton ...	3.00	14.60	18.14	16.67
Stockport ...	3.07	12.80	14.65	15.70	Stansbury...	2.91	14.04	18.12	18.11

RAINFALL TABLE—*continued*

Station.	For Sept., 1910.	Av'ge. to end Sept.	To end Sept., 1910.	To end Sept., 1909.	Station.	For Sept., 1910.	Av'ge. to end Sept.	To end Sept., 1910.	To end Sept., 1909.
Warooka....	3.12	14.01	19.53	15.10	Bordertown .	3.18	15.65	16.48	17.85
Yorke town .	3.04	14.72	18.86	15.07	Wolsley . . .	3.56	13.71	18.01	18.76
Edithburgh..	2.75	13.69	19.22	14.14	Frances . . .	3.29	15.74	19.40	18.65
Fowler's Bay.	1.45	10.51	9.30	10.34	Naracoorte .	5.10	17.89	22.50	21.68
Streaky Bay.	2.27	13.28	14.05	15.80	Lucindale ...	4.19	18.81	24.56	23.75
Port Elliot.	2.77	14.00	17.19	16.36	Penola	3.97	21.44	26.18	24.93
Port Lincoln.	2.23	17.11	20.02	16.28	Millicent . . .	4.36	24.89	30.86	33.98
Cowell	1.72	9.49	11.02	8.43	Mt. Gambier.	5.12	25.53	34.86	34.97
Queenscliffe .	—	15.57	—	16.23	Wellington ..	2.03	11.90	15.04	17.06
Port Elliot ..	2.20	17.12	19.09	16.47	Murray Bridge	1.81	11.16	17.78	17.22
Goolwa	2.20	14.62	19.27	20.47	Mannum ...	1.61	9.29	15.00	12.17
Meningie....	2.45	15.64	16.96	21.13	Morgan	3.14	6.66	11.80	7.29
Kingston....	4.79	20.47	24.62	26.47	Overland Crnr	3.16	8.37	15.64	8.43
Robe	3.68	20.91	26.55	26.24	Renmark....	2.87	7.73	13.20	9.69
Beachport...	3.74	22.89	30.41	33.23	Lameroo ...	3.21	—	15.53	15.54
Coonalpyn ..	2.37	14.07	13.76	19.60					

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Government Produce Department reports on September 30th :-

BUTTER.

The very mild season experienced has meant a large increase in the production of butter, and the general absence of weeds has assisted materially in keeping the bulk of the butter of excellent quality. The demand has proportionately increased, the present prices being—Superfine, 11d.; pure creamery, 10d. per pound.

Messrs. A. W. Sandford & Co. report on October 1st :—

FLOUR.—City brands, £9 10s.; country, £9 5s. per ton of 2,000lbs.

BRAN.—11½d. to 1s. per bushel of 20lbs.

POLLARD.—11½d. to 1s. per bushel of 20lbs.

OATS.—Local Algerians, 2s. to 2s. 1d. per bushel of 40lbs.

BARLEY.—Cape, seed, 2s. 3d. to 2s. 4d. per bushel of 50lbs.

CHAFF.—£3 5s. f.o.b. Port Adelaide, per ton of 2,240lbs.

POTATOES.—Gambiers, £6 10s. to £6 15s., on trucks, Adelaide or Port, per ton of 2,240lbs.

ONIONS.—Gambiers, nominal, £7 10s. to £8, on trucks, Adelaide or Port, per ton of 2,240lbs.

BUTTER.—Factory and creamery, fresh, in prints, 10d. to 11d.; choice separators, dairies, 9d. to 10d.; stores and collectors, 7½d. to 8d.

CHEESE.—Factory makes, new season's, 5d. to 5½d. for large to loaf per lb.

BACON.—Factory-cured sides, 7½d. to 8d.; middles, 8½d. to 9d.; farm flitches and rolls, 5d. to 6d.

HAMS.—In calico, 9½d. to 10½d. per lb.

EGGS.—Prime, guaranteed new-laid hen, 7½d. per dozen.

LARD.—Skins, 6d.; tins or bulk cases, 5½d. per lb.

HONEY.—Prime clear extracted, 2½d. to 2¾d.; second grades, 1d. to 1½d.; beeswax, 1s. 1½d. per lb.

ALMONDS.—(Scarce) soft shells, Brandis, 6¾d.; mixed soft shells, 6½d.; kernels, 1s. 3d. per lb.

LIVE POULTRY.—Good table roosters, 3s. to 3s. 6d. each; plump cockerels, 2s. 6d. to 2s. 9d.; hens and light cockerels, 1s. 9d. to 2s. 6d.; ducks, 2s. 6d. to 3s. 6d.; geese, 3s. 6d. to 4s. 6d.; pigeons, 9½d.; turkeys, 8d. to 10d. per lb, live weight, for fair to good table sorts.

AGRICULTURAL BUREAU CONGRESS.

TWENTY-SECOND GATHERING.

The Twenty-second Annual Congress of the Agricultural Bureau was opened by the Minister of Agriculture (Hon. J. P. Wilson, M.L.C.) on September 12th, at 8 p.m., continued on the 13th, and concluded the following evening.

During the sittings the following delegates attended:—Amyton—T. O'Donohue, T. Griffin, and S. Thomas; Angaston—S. Smith and R. Player; Appila-Yarrowie—J. W. Lyons, J. Wilsdon, J. H. Bottrill, and J. H. Klem; Arden Vale and Wyacca—O. Hanneman, E. Klingberg, and A. Eckert; Arthurlton—S. T. Lamshed and W. R. Stephenson; Balaklava—G. C. Neville, H. Twartz, and A. W. Robinson; Beetaloo Valley—G. Thyer and F. Bartrum; Belalie North—A. H. Warner, W. Cummings, and F. D. Bladon; Brinkworth—T. Brinkworth; Bute—J. Wauchope and M. L. McCormack; Butler—R. W. Phillis; Caltowie—N. Hewitt, F. Lehman, J. G. Lehman, and G. Petatz; Carrieton—F. Vater; Cherry Gardens—C. Ricks; Clare—F. Lee and P. M. Daly; Clarendon—A. Harper; Colton—P. P. Kenny; Coomooroo—E. C. Brice and E. Berryman; Coonalpyn—G. E. Venning and T. Fidge; Cradock—J. Smyth, T. Hilder, and J. H. Lando; Crystal Brook—H. Billingham, W. J. Venning; Cummins—J. Durdin; Davenport—J. Holdsworth and E. J. Lecky; Elbow Hill—W. T. Cooper, S. V. Wake, G. F. Wake, and E. R. Wake; Forster—W. Searle, W. J. Sears, and W. Towill; Frances—J. C. Brown and E. L. Atkinson; Freeling—G. A. Block; Gawler River—J. H. Dawkins and F. Bray; Georgetown—W. Thomas and S. Eyre; Geranium—W. Mitchell and A. R. Dohnt; Green Patch—A. E. Howard; Gumeracha—D. Hanna and J. Sandercock; Hartley—J. Stanton and W. Bermingham; Hawker—C. W. Pampa; Hookina—B. Sheridan and D. E. Madigan; Johnsburg—A. Brook and J. A. King; Kadina—J. Southwood; Kalangadoo—R. Boyce and J. A. Sudholz; Keith—J. A. Lock and J. W. Dall; Kingscote—V. H. F. Cook; Kingston—R. O. Lloyd and W. England; Kybybolite—C. H. Scholz, D. Pettit, and C. Hahn; Lameroo—E. J. Trowbridge, T. Leckie, W. J. Trowbridge, and A. J. Koch; Longwood—J. R. Coles and J. Roebuck; Lucindale—S. Rayson, W. M. Secker, and T. W. G. Secker; Lyndoch—J. Mitchell and J. Woolcock; Maitland—E. G. Jarrett and C. Pitcher; Mallala—J. J. McCabe; Mannum—G. H. Mann and F. E. Schuetze; Meningie—R. N. Scott and W. Tregilgas; Merghiny—A. Shilton; Millicent—E. J. Harris; Miltalie—W. E. Hier and R. J. Searle; Morchard—H. Loftes, J. B. McDougall, and J. Scriven; Morgan—H. Wohling and

R. Wohling, jun.; Mount Bryan—R. W. Dunstan and J. J. Kelly; Mount Bryan East—J. Thomas, jun. and F. Tralaggan; Mount Gambier—A. Sassanowsky and D. Collins; Mount Pleasant—P. Miller, D. C. Maxwell, and R. Godfree; Mount Remarkable—T. H. Casely and J. McIntosh; Mundoorra—W. J. Shearer; Murray Bridge—H. Patterson and J. Doyle; Nantawarra—F. Sutton and G. N. Gosden; Naracoorte—S. H. Schinkel; Narridy—P. Smart, H. H. Nicholls, W. F. Nicholls, and J. Darnley; Northfield—N. S. Kelly, W. J. Kimber, J. W. Dall, and J. Williams; Ororoo—W. Robertson, W. W. Collins, and W. Lillcrapp; Parrakie—F. J. Daymon and J. Burton, jun.; Paskeville—A. Goodall and J. Pontifex; Penola—D. McKay, D. Adamson, L. W. Peake, and L. Stapledon; Petina—J. Souter; Pine Forest—F. Bayne and R. Barr, jun.; Port Broughton—T. E. Pattingale; Port Elliot—H. B. Welch and W. Hargreaves; Port Germein—E. G. Blesing and A. Carmichael; Port Pirie—T. Johns, C. E. Birks, and E. J. Hector; Quorn—R. Thompson and J. McColl; Redhill—D. Lithgow and T. Dunsford; Renmark—E. Pitt and F. Cole; Rhine Villa—F. E. Hecker; Saddleworth—F. Coleman and J. H. Eckerman; Salisbury—A. G. Jenkins and A. E. V. Richardson, B.A., B.Sc.; Shannon—E. Smith and L. Smith; Sherlock—J. N. Wyatt and J. B. Coombe; Stockport—S. Nairn and J. Murray; Strathalbyn—J. W. C. Fischer and T. Collett; Sutherlands—F. H. Snell, A. M. Twartz, and H. Mibus; Tatiara—C. Saxon; Uraidla and Summertown—T. H. Collins and W. Dyer; Utera Plains—T. Hornhardt and A. Ramsey; Waikerie—E. J. Burton and F. Emmett; Watervale—C. E. Sobels, C. Solly, and E. C. Sobels; Wepowie—J. Crocker and J. E. Pearce; Whyte-Yarcowie—F. H. Lock, W. Hunt, and E. J. Pearce; Wild Horse Plains—H. W. Lyons; Willunga—J. A. Hughes and E. Bigg; Wilkawatt—W. J. Bowman and H. M. Harvey; Wilmington—S. George, R. G. S. Payne, J. Schuppan, and W. Schuppan; Wirrabara—H. Lawson, H. E. Woodlands, P. Lawson, and C. Hollett; Woodside—C. W. Fowler and A. S. Hughes; Yallunda—A. G. Price and G. Provis; Yongala Vale—E. T. Daly, E. Cooper, and C. Fowler; Yorketown—C. Domaschensch, R. Newbold, and J. Bartrum.

The chair was occupied by the Chairman of the Advisory Board of Agriculture (Mr. J. W. Sandford), who asked the Minister to declare the Congress open.

MINISTER'S ADDRESS.

The Minister, who was cordially received, said—"I am very pleased to see such a large gathering to-night, and I feel honored at having been asked to open this Congress. The crowd in this building represents a fact which augurs well for the various agricultural interests of our State—(applause)—and shows the very keen interest which is being taken in the agricultural welfare of our country. I congratulate the producers on the splendid results of last season, and on the equally promising prosperity of the coming season.

Figures are not the most interesting material to place before an audience, but it is only by doing so that we can at all realise the stupendous advance which the agricultural industry has made in South Australia. (Applause.)

SPLENDID FIGURES.

"For the first time on record our wheat yield exceeds 25,000,000bush., but with large areas being opened for settlement we may confidently expect to exceed 30,000,000bush. within a few years—an achievement which would have been ridiculed as impossible 10 years ago. (Hear, hear.) The acreage under cereals last year was 200,000 in excess of the preceding year, and if the sale of manures is a safe guide—and in the past it has proved fairly so—we may anticipate at least an equal increase this season. (Applause.) The value of our cereal crop last year approximated to £6,000,000, while the past five years' gross total exceeds £24,000,000 sterling. Without taking into consideration the value of the increase in stock, the value of rural production for 1909 amounts to something like £11,000,000, or between £27 and £28 per head of population, figures which I think can scarcely be excelled in any other part of the world. (Applause.) This year something like 18,000,000bush. of wheat have already been exported, while last year pastoral products to the value of two and a quarter millions sterling were shipped—big figures for a comparatively small community. (Applause.)

THE LAMBING SEASON.

"The lamb season just opening promises to be very satisfactory. With favorable growing weather and abundance of feed, they should reach the works in prime condition. Our dairy industry is also reflecting the favorable season. We started shipping earlier than usual. This year, up to September, we had sent away 163 tons of butter against 11 tons up to the same date last season. (Applause.) We have every prospect of almost a record dairy-ing year. The fruit and wine exports of the past year have also drawn large increases, and the future for both these industries is decidedly bright. (Applause.)

THE AIM OF THE GOVERNMENT.

"It is the aim of this Government, as it has been of former Governments, to foster the agricultural industries in every way. (Applause.) In former years it has not always been possible to be liberal in our expenditure, but this cannot be said of the last few years. The Government to which I have the honor to belong do not intend to reduce any of the activities at present in operation. (Applause.) Where it is possible to open new avenues or engage in new activities that will be done. Lands are being purchased and thrown open for closer settlement. The railway policy of the Government will be one that has not been equalled in the earlier history of our State.

Altogether you may take it for granted that the rural industries will receive the closest attention and the utmost consideration. Last year's gross expenditure on the different sections of the Agricultural Department exceeded £80,000. For the current year these figures will be increased. (Applause.) It is therefore a matter of great importance to the State that the large sum should be put to the best advantage, and, as you are aware, a Royal Commission is about to be appointed to deal with agricultural matters in this State. I hail with delight as Minister for the time being that appointment, because we will get out of difficulties, and entanglements will be disentangled. The result should certainly be to aid the easier working of the department, and a strengthened interest in agricultural affairs.

HELPING THE PRODUCERS.

"To give some idea of what the Government is doing to help producers I might mention that, in addition to the Agricultural College Farm and the various experiment plots carried on for the department by members of the Bureau, we have quite a number of experiment farms. At Loxton, Veitch's Well, and Shannon we are testing the new areas; at Minburra the growing of wheat under extremely dry conditions; at Parafield and Turretfield we are attempting to produce improved strains of seed wheat; at Murray Bridge and Pekina we are experimenting with irrigation under entirely different conditions; we have also experimental orchards and poultry farms. (Applause).

BACTERIA OF THE SOIL.

"You will doubtless have noticed in the telegrams from England references to a recent discovery by scientists working at Rothamsted Experiment Station in respect of the bacteria of the soil. Farmers in this State have long known that a good burn of scrub or stubble has a very beneficial effect on the next crop, but it has not been known why. These experiments referred to indicate that it may be due to the destruction by heat of injurious organisms in the soil. The subject is one that may prove of vast practical value to our State, and you will be glad to know that it is not being neglected by our officers. At Roseworthy College Mr. Colebatch has a number of experiments in this connection, and though we cannot, of course, expect any definite results in one season, the work in hand will probably prove of great value to the State. (Applause).

ROSEWORTHY COLLEGE.

"While I am speaking about Roseworthy I would refer to the complaint of the Principal that the college is not supported by farmers in the most practical way, i.e., by sending their sons to it, as it should be. It is curious that in times when we hear so much of the value of science in farm work that there should be so few sons of farmers taking the Roseworthy course.

Mr. Colebatch says, 'In the Principal's report for the current year I took occasion to refer to the absence of farmers' sons on the college roll in the following terms :—The college roll-book shows the number of students in attendance during the year 1909-10 to be 52, but the average number in residence at any period was about 48. Actuated by a desire to obtain to what extent the farmers of this State were taking advantage of the course of instruction provided at the Agricultural College, I made a close scrutiny of the roll and classified the students according to the occupation of their parents. The result obtained, I regret to say, cannot be regarded as other than a reproach on the farming community of the State. New South Wales, Victoria, and Western Australia, taken collectively, are represented on the college roll to an equal extent with the South Australian farmers. The great bulk, however, of those in attendance come either from the city or rural homes that have no connection with land. I am aware that practically the whole of the present students will eventually settle on farms of their own, but that in no way detracts from deplorable apathy of the farmers in a matter that directly concerns the future of their children. In times of small yields and lean prices there was a tissue of excuse for the struggling farmer who felt compelled to retain his sons' services in the family interest; but surely to-day no one would dream of employing an argument so chimerical to support the continuance of such a system. That the farmers themselves recognise the good value of the work carried on here is evidenced by their increasing numbers and regular attendance on Farmers' Day, by the stream of inquiries with which they favor us, and by the keen interest they evince in all reports emanating from the college. It therefore seems to me that in the matter of their sons' education they are woefully indifferent or thoughtlessly selfish. The question does not directly concern me, as my position here is of a temporary nature; but as a South Australian, and one who is desirous of seeing the productive capacity of the State steadily increase and the result of agricultural progress maintained, I sincerely trust that the time is at hand when the farmers' sons of South Australia will be allowed to come into the heritage which the Government has so fittingly provided for them.' These remarks were based on an examination of the college roll for the year ending March, 1910. While the Government is anxious to give young men from the cities the opportunity of acquiring a practical and scientific knowledge of agriculture to fit them to go on the land, we would feel better pleased if the farmers of the State made better use of these opportunities. The college could take a much larger number of students without greatly increasing the cost of management. (Hear, hear.)

PROFESSOR PERKINS.

"As you are aware, Professor Perkins is absent on a trip to Europe inquiring into matters connected with agricultural interests, and at the same time

enjoying a well-earned holiday. (Applause.) We believe he will be more valuable to the State as a result of this visit. One matter he is to inquire particularly into is the use of motor tractors for farm work. This is a subject of great interest to farmers, and will, I understand, be dealt with at this Congress. In the same way the 18 months spent by the Manager of the Produce Department (Mr. Pope) in Europe has better fitted him for the position he occupies. He has gained a great deal of information concerning the requirements of the European consumer, and will be able to advise producers here accordingly.

GLIMPSE AT OTHER COUNTRIES.

"It is as well to take a glimpse at other countries and get some idea of the work that is being done, and from which we can derive benefit. From a report placed before me by Major Norton, dealing with his and Mr. Pope's travels on the Continent, I have culled a few interesting extracts. Denmark has made wonderful progress; and we might look with profit at what that country is doing. Here are some very suggestive facts and figures. Denmark exports annually butter, eggs, and bacon to the value of nearly £16,000,000, and this development may be said to have taken place within the last 25 years, and the chief reasons given were as follows :—(1) That the laws do all to prevent the creation of new large farms and the joining of small ones together. (2) That a proportion of the peasant lands, which 50 or 60 years ago belonged to the large estates now belong to the farmer himself; only one-fifteenth of the agricultural population are tenants or leaseholders, the remainder are freeholders. In 1882 the first co-operative dairy was started in Denmark, and to-day there are 1,157 co-operative creameries and factories with an annual export of 202,000,000lbs. of butter. In Denmark scientific and practical farming go hand in hand. In the above connection it may be interesting for comparative purposes to note that Denmark has a total area of only 14,844 square miles (9,375,403 acres), with a population of 2,600,000. There are 2,117 large estates or 'gentleman farms,' 75,320 peasant farms, and 68,000 small holdings. The quantity of land in the latter is from three to seven acres. On a well-cultivated small holding there are generally two or three cows, about 20 pigs, and anything up to 150 head of poultry. Trifolium factory was founded in 1899, with various branches for separating the milk from the 'large farms.' The foundation capital is £55,000, its members about 85, with, in all, 12,000 cows. About 65,000,000lbs. of milk pass through the factory annually. The value of butter and cheese produced is about £400,000. 'On visiting the cheese storerooms,' says the report, 'we were quite amazed at what we saw. To give some idea of the dimensions we were told that the length of the shelves the cheese was stored on would cover more than 13 English miles. At the time of our visit there were about 50,000 cheeses in the room of all sizes, varying from 2lbs. to 200lbs. apiece.'

The Co-operative Bacon Factory in Esbjerg was founded in 1888, at a cost of £6,000. There were then about 3,000 members, and the first year 18,000 pigs were delivered, to a value of about £55,000. At present the foundation capital exceeds £30,000 and the members number close upon 10,000. The annual output of pigs exceeds 100,000, worth over £300,000. This factory employs about 70 permanent men. Apart from the bacon trade it also goes in for the slaughter of cattle and manufacture of sausages.

TRAINING FARM FOR BOYS.

“ Now, there is one matter which I desire to deal with, and concerning which I have taken considerable interest—that is the establishment in our State of a training farm for boys. During the past few weeks this question has received considerable attention both in Parliament and in the press. Congress also purposes to discuss it. In establishing this institution for boys, it is my desire to make provision for the boys of poor parents who desire their boys to become farmers to acquire a rudimentary agricultural education free of cost to such parents or guardians, and by such an education so fit the boys, when their term at the farm expires, to accept employment with farmers with the object of educating them on to the soil so that they in time may themselves become farmers. An institution of this character will create a triple value—(1) it will open a healthy avenue of employment and education for many of our city lads, (2) it will provide intelligent farm employes, (3) it will encourage rural settlement. For this purpose, realising the scheme would be started upon a small scale, I would utilise one of the Government farms until such time as it could be demonstrated that—(1) there are sufficient lads desiring to take up this work to warrant any considerable outlay, and (2) that there is a demand amongst the cultivators of the soil for the boys from the school. (Applause.) Should Cabinet agree to the scheme I shall establish the training farm at Turretfield. I have discussed the question with the Dairy Expert, and he assures me that he could find work and give the necessary instruction to from 20 to 25 boys. Turretfield offers good facilities for training these lads as, in addition to a fairly large area being cropped for hay and grain, green fodders are grown for stock, ensilage is made on a fairly large scale, and dairying and pig-raising are large items in the work. In addition, there would be no difficulty in establishing a small poultry station, a fruit and vegetable garden, and a bacon-curing section. The boys would be taught the general management and handling of horses, cows, pigs, poultry, &c.; the uses and construction of different farm implements; the handling and utilisation of various farm crops; the why and wherefore of methods of cultivation; and the making of butter and the curing of bacon. To instruct the boys there shall be a trustworthy man, thoroughly experienced in general farmwork, with a good knowledge of farm implements, capable of managing boys and imparting information

to them. The general education of the boys will be attended to by the formation of classes for the purpose, and a library of selected books.

CHAFF ACT.

"Legislation dealing with agricultural interests is to be dealt with by Government. The Chaff Act requires to be made effective. (Applause.) I regret that there should be so much dishonesty amongst a section of the trade as to render legislation necessary. Too much adulteration is practised and purchasers are victimised in various ways. The Bill is to remedy the present state of affairs and will be introduced this week. Then it is intended to legislate to bring insecticides, fungicides, and similar preparations under regulation somewhat on the lines of the Fertilisers Act. This is a matter of great importance to farmers, stockowners, and fruit-growers. (Applause.)

COMPULSORY FUMIGATION.

"Another matter of interest to fruitgrowers is the question of compulsory fumigation of citrus trees and spraying generally. (Applause.) Recently a representative deputation waited on me and requested that the Government should take up this work. Some of the growers mentioned that they had spent large sums in fumigating their trees and protested against this expenditure being made an annual one because of the neglect of their neighbors. (Applause.) Similar complaints are made in respect to neglected orchards generally, and it certainly seems unfair that growers should be put to unnecessary expense in this way. (Applause.) Most of you will agree with me that no one has a right to cause financial injury to his neighbor by his carelessness, and the matter of compulsory action is deserving of serious consideration. (Applause.)

BITTER PIT.

"In regard to the disease known as bitter pit in apples and pears the late Minister of Agriculture induced the Ministers of Agriculture in the apple-growing States to agree to share the cost of thorough investigation by a competent pathologist. Unfortunately, no one is available in Australia for this work and the proposed investigation is at a standstill. In view of this the Government has requested the Federal authorities to take the matter up and secure a pathologist from Europe, the cost to be shared by the different States and the Commonwealth. We hope that this will be done. (Applause.)

IRISH BLIGHT.

"The present Act dealing with fruit diseases will also be amended, as it is not sufficiently up to date to meet present requirements. Unfortunately,

Irish blight in potatoes has got a firm hold in and around Adelaide, and in order to protect other parts of the State it has been necessary to invoke the assistance of the Commonwealth Government to quarantine the infected areas. The Government consider that the power to deal with internal matters should be retained by the State, and as the present Act does not give sufficient power in this respect amending legislation is to be introduced. (Applause.)

EXAMINATION OF STALLIONS.

“A matter that has caused considerable discussion is the veterinary examination of stallions. (Hear, hear.) This was discussed at last year's Congress, and is down on the agenda paper again. The Government is determined to prevent South Australia being made a dumping-ground for unsound stallions. (Applause.) Legislation in the other States providing for veterinary examination has resulted in numbers of neglected stallions being brought to this State, and if permitted to continue this must have a very detrimental effect on our stock. (Applause.) In connection with subsidies of agricultural societies we have the power to prevent any but sound stallions being exhibited at our shows, and we should be neglecting our duty if we did not exercise this power under present conditions. (Applause.) We do not, however, wish to inflict any unnecessary hardship on stockowners; and if definite suggestions are made by the Congress by which the object in view can be better secured they will be favorably considered (Applause.)

LAND SETTLEMENT.

“During the past year over 814,000 acres were allotted by the Land Board, and 400,000 acres were surveyed for settlement, but this quantity is insufficient to meet the demand. Owing to the difficulty in obtaining sufficient surveyors the opening up of land for settlement is considerably retarded. Large areas of land are now being surveyed in different parts, chiefly on Eyre Peninsula, along the route of the proposed railway to Darke's Peak, and east of the Murray on the Tailem Bend to Brown's Well railway route. Including the area in other parts, something like a million acres are under survey or to be surveyed during the year. (Applause.) These two railways will probably open for settlement a total of 3,000,000 acres, so that we may look for continued development of our farming areas for some years to come. Early next year 22,000 acres of the Struan Estate, recently purchased by the Government, will be offered, while 14,000 acres at Beri Beri is to be surveyed to give irrigation blocks to be worked with the high land blocks. (Applause.) I have much pleasure in declaring the Congress open.” (Applause.)

THE DISCUSSION.

The Chairman—"The best thanks of the meeting are due to the Minister for his able address. (Hear, hear.) Although this is the first time this Minister has addressed Congress, his remarks show a good grip of agricultural matters, and we hope that on future occasions he will give us an equally able address." (Applause.)

Mr. Dunsford (Redhill)—"The Minister has advised farmers to send their sons to the Roseworthy College. As a practical farmer myself, I will give him reasons why we do not send them. (Hear, hear.) Farmers' sons are too valuable to waste time at the College paying money to learn how to drive a team of horses. My sons to-day are worth £200 a year each to me on the farm. The college ought to give them the commercial knowledge—(applause)—and we will give them all the farming they want at home. (Applause.) If the college will give farmers' sons a commercial knowledge we will send them there."

Mr. Kenny (Colton)—"The Minister has stated that in these prosperous years there is no reason why the farmers should not send their sons to the college. The position, however, in these prosperous seasons is worse, as we are unable to get a boy or a man anywhere—without you get your neighbors' men." (Laughter.)

Mr. Fowler (Yongala Vale)—"As regards the examination of stallions, what is the good of prohibiting them from exhibition at shows if the unsound stallions are allowed to travel?"

The Minister—"It is the fault of the farmers if they employ these stallions. (Hear, hear.) Every stallion that has passed the veterinary has a registration card, and if it is not carried do not employ the horse. The registration is to protect you."

Mr. Venning (Crystal Brook)—"I propose a hearty vote of thanks to the Minister for his address. The college should try and educate the right stamp of men. It is not doing all it should do in this direction."

Mr. W. R. Stevenson (Arthurton)—"In connection with the discussion about the college we are apt to overlook one side of the question. We all recognise that we have received a great deal of indirect benefit from the College. Professor Lowrie went throughout the State preaching super-phosphates and scientific agriculture, and if it had not been for that South Australia would not be in the position she is to-day. (Applause.) I was pleased to hear the Minister give those figures about Denmark; but you cannot compare Australia with Denmark in dairying. I second the vote of thanks."

Mr. G. Jeffrey—"I have great pleasure in supporting the motion. The Minister's speech is something we can keep before us for a long day to come."

The motion was carried by acclamation.

The Minister—"I cordially acknowledge the vote of thanks. I am glad you appreciated the little I had to say. One delegate has stated that every farmer's son is worth £200 to him to-day. I wonder whether he would like to pay a £200 tax on all the sons he has."

Mr. Dunsford—"That is an absurdity."

The Minister—"I am afraid that everything in the way of taxation is absurd. I apologise to that gentleman for making such a very absurd remark. I hope great results will follow from your meeting together this year." (Applause.)

The Chairman of the Advisory Board (Mr. John W. Sandford) said—"In submitting my heartiest wishes to you for a pleasant and also intellectual period during this Conference, it is doubly pleasing to myself to still have the honor of being the Chairman of your Advisory Board, for when one remembers the enthusiasm that was imparted into the Conference of this time 12 months, it is fair to assume that the various matters on the agenda papers this year will receive equally full consideration at your hands. There is no gainsaying the fact that whilst we undoubtedly cannot have good yields unless favorable weather conditions prevail, it is also recognised to-day that those on the land, to keep well in the front, can only do so by applying the most approved methods, thereby obtaining the best results from their labor. (Applause.) Now it is freely admitted that in old days farmers simply went their own way, most of them by a rule of thumb system, whilst those who did experiment, and where success was achieved, there was no means of conveying to others the advantages attained, and invariably any such were lost perhaps after a few attempts. There also must have been great loss of time and waste of money in each one attempting something, and where failure was established it would have been better had this been published to the world. (Applause.) However, to-day we live in an advanced age. I venture to say that the South Australian agriculturists in at least wheat-raising could give points to our neighbors in the Commonwealth. (Applause.)

COUNTRY CONFERENCES.

"Your Advisory Board during the year has not been allowed to be idle, as again our energetic secretary (Mr. Summers) has seen that we are kept employed; indeed, it would be almost impossible to relate to you the many suggestions which have emanated from the Branches during the past 12 months. (Hear, hear.) During the year I have had the pleasure of attending a Conference held at Bordertown, where representatives from practically the whole of the South-East were present, and indeed visitors from Victoria attended, when each of the subjects were dealt with to the fullest extent. I also visited the Cherry Gardens Branch, amongst the fruitgrowers, and it was delightful there to find the intelligent and keen interest which is taken in the debates by not only the older members, but a very pleasing feature

was the number of younger men who are taking an active part. (Applause.) Thus you will see the South Australian Agricultural Bureau system is on sound lines, and is being handed from father to son, but unfortunately the Conferences in the country have not all attained the success desired. The lack of interest in some parts has been decidedly pronounced, and such meetings have fallen flat. Therefore, to bring about a greater activity and a more healthy tone in these Conferences, at the Free Parliament you will have opportunities of discussing the advisability of free railway passes being issued to delegates to the Conferences in their districts in lieu of the free pass tickets to this Annual Conference. In this direction, however, I question the wisdom of taking any action which would tend to lessen our numbers at the General Conference in Adelaide, as then undoubtedly a better opportunity offers of all meeting from the different districts and exchanging their views. (Applause.)

BRANCHES.

“ During the year 15 new Branches have been established, there now being 122 in all, whilst six, I regret to say, were closed owing to lack of interest. Now, in this direction again I would like to give a warning note, that after all it is not so important the membership should consist of large numbers so much as the energy and activity of the Branch. (Applause.) Where they display indications of lacking this your board and secretary try their utmost to bring them into line. One can hardly understand a body of farmers in any district not doing their share of the work in the Bureau Branches (Applause.)

DAIRYING.

“ The favorable seasons of late have in this department of the farm assisted the dairymen to a very considerable extent, for I quite believe that the herds are more numerous to-day than at any previous period since the industry was established. (Applause.) The exports bid fair to break all previous records. (Applause.) Shipments of butters are now in full swing to the mother country, and the gratifying feature is that South Australian butters hold well their own on the world's markets, for the proof of the pudding is the excellent prices returned to the producers for it. (Applause.) The tonnage this year so far exceeds any previous year, and given anything approaching the present excellent prospects, we should exceed for export by several hundred tons that of any shipping season. At the same time we not only have full and plenty for our own requirements, but are supplying our excellent customers, Broken Hill, and also to a very considerable extent Western Australia. Other branches of the dairying industry continue to prosper; larger supplies of eggs finding markets, as also cheese and bacon. In the latter line I feel fully convinced that our agriculturists would be well advised in always having the live hog to eat up the broken or damaged grain,

for it certainly will always pay better to put it into pork than to sell at the low figures which usually offer for damaged corn. As for the market in bacon, it is unlimited, and I look forward to the day when carcass pork will be shipped in quantities from South Australia to the mother country. (Hear, hear.)

ENSILAGE.

"The value of ensilage as a fodder cannot be too strongly urged, for if dairying is to play its part as an important branch in farming, there is no questioning the importance of providing in some form for late summer or autumn fodders. (Applause.) With such a favorable season as the present there is danger that many thousands of tons of good feed will go to waste. Therefore why not as an insurance put away in silos or in some form at least a portion of this present abundant growth.

IRISH BLIGHT.

"This is a matter which has been under the consideration of your board, and the ravages of this pest are much more severe than perhaps is generally understood. Unfortunately it appears to thrive in and favors moist conditions; consequently, hundreds of our planters of potatoes along the hills and in the wet parts have lost heavily through this Irish blight. I would therefore like to hear that some competent man's services could be obtained to give this blight and such diseases as takeall and bitter pit his entire thought towards advising the best remedies for eradicating these diseases. (Applause.)

PROSPECTS.

"Last year at this period the prospects then were undoubtedly bright, and pointed to at least a good harvest being reaped; but I question if even the most sanguine ever expected that it would reach as it did over 25,000,000 bushels. In other words this was sufficient to supply South Australia for all her flour, wheat, and seed requirements, and then have for sale to other countries something like 21,000,000 bush. My best hope is that the coming harvest will at least obtain for you equal to that of last season."

A vote of thanks to the Chairman closed the meeting.

SEPTEMBER 13th.

MORNING SESSION.

There was again a large attendance and the chair was occupied by Mr. J. Miller.

PAPER ON THE BEST WAY FOR YOUNG MEN WITH SMALL MEANS TO COMMENCE FARMING.

Mr. J. W. Dall, of Northfield Branch, read the following paper on this subject:—

"In the first place get a knowledge of the work. If you have not been brought up on a farm hire yourself out to a good farmer for a year, and try

to get a thorough insight into the system and working. This will enable you to form some idea of the nature of the work and what it is to do it. Without this many form wrong ideas, and not only become disheartened and disappointed, but often lose their little savings and give it up as a bad job. If after having gained this knowledge you still retain the idea of going farming look out for a good block of Government land, from 500 to 1,000 acres, if you can, in the best district possible. I say Government land because all private and improved land is too high in price for a man of small means. If he cannot get land of his own, the next best plan is to take some on the share system; but the securing of land that you may make your own in future years is much preferable, as you can at once begin to form a home. Be it ever so humble it is a help to know that you have made a start in that direction.

"One important matter to decide is what is meant by small means? Well, I would call your means small if after taking up your land at, say, a cost of £30, being the first year's instalment of principal and interest, you only had £70 left. For all that, it is possible to start on this sum, and has, in fact, been done many a time. After all, it is not so much what you have got as what you are, and what grit and determination is in you to set out with a fixed purpose to be a farmer, and a good one too. But how are you going to do it? To answer this question is rather hard, as I know from experience there are difficulties in the way, but the old saying, "Where there is a will the way is made," is quite true.

"As a general outline I would advise you to work up a cheap team of horses or bullocks, and the necessary implements, and do a little for a start or get a bit of work to do in the harvest for someone that can help you or pay you. Pick the part of the land that can be cut or rolled with least cost, but do not select any plains that may be in your block as these should be fallowed before putting under crop; and as these plains grow more feed you may need them for pasture. Supposing the land to be scrub, get it cut or rolled in the spring of the year if possible, and leave the burning until February or March. By this means any shoots that grow between cutting and burning will be destroyed. All scrub land should be put in after burning as soon as can be; it does not need fallowing, indeed, leaving it a year would mean a loss and incur a lot of labor in shoot-cutting. Sow with 30lbs. of good sound graded wheat and 80lbs. of manure drilled in, if possible. Disc drill must be used on scrub lands. It is much better to manure even new land, as the better your crop the greater chance of getting a good stubble, and this means a lot, as the burning of the stubble puts the land in good order for second crop, which should be put in the following season.

"If you are within 20 miles of a Branch of the Agricultural Bureau join it; you will get help through it that will be of advantage to you, and in addition to the help in the way of advice it is a kind of farmer's brother-

hood where you will find that others take an interest in you and your doings.

“When you have got your seed in see to the fencing, which may be done with stakes and barbed wire; this you can move back each year as you enlarge your clearing or put it back in the scrub where you intend to clear if you can get the wire and time to do it. If the weather is dry you may find stakes do not drive well even after a bar has been driven in. If you have any difficulty in this respect take some water with you to pour in the hole as you punch it down, and you will find it a great help. A very little water does, 5galls. would go a long way.

“How am I going to live through the year? Some cart a bit of firewood, where possible, or get a job as before mentioned; anything to keep things going for the time. You will wonder how you are going to get through, but you will if you make up your mind and have your health and strength. How about a home or place to live in? Get a good tent to start with; if you can get a mate so much the better. Make up a hut as soon as you can that will do for an outhouse after you are able to build a better house. Provide a stable if you have horses. This can be made out of material mostly found on the land; good strong forked poles 9in. through, roof and close in with mallee shoots, broom bush, or anything that will turn the water. If you can get iron it will help you with a little rain water which will be very useful.

“If you have £450 to £500 to work on, still bear the leading ideas in mind and launch out accordingly. In this case I would advise that you provide for your land accordingly. You may be able to take a larger block, say to cost you £50, in payment of first instalment of principal and interest. Pay this, and provide for second year's payment of same, as it is just possible you may not get much return from your work the first year. This will take the first £100 of your cash. Then spend another £100 on the best team of horses or bullocks you can get for that amount. As to implements, you may do with a good disc drill on your newly-cleared land, supposing it to be light and open, as most scrub land is. I do not recommend this kind of work, though it may be done under some conditions. Then you will need a set of stump-jumping harrows; these, with drill, will cost you, say, £40; for seed wheat and manure, say, £25 to £30; feed for your team, £25. You will want a house of some kind, and I would advise you to decide what kind of a house you intend to aim at for your future home, and build part of it, say three back rooms, which may be done for £100 if you put stone, sand, and lime and water on the ground, which I will suppose you can get on the land; by burning your own lime, and helping do the work, and not finishing inside more than is needful to make it weather-tight. This will leave you about £100 if your capital to start with is £500. This balance will be needed for your living and as little fencing material as you can do with. You will see that I am leaving the work of clearing and putting in

crop, &c., to the farmer himself. Something in the shape of a scrub-roller to break down scrub is needful. This you may make or join a neighbor in making for joint use, as strict economy will be needful. Sundry tools and accessories will absorb a few pounds, but here also economy must be practised.

"I cannot go into detail in a paper of this kind, but I know there are a lot of good men with little capital who are wanting to improve their position, and feel it just impossible. If writing this paper will make the way plainer I shall be pleased. We may be met with the discouraging statement 'It is impossible,' and I grant it looks like it, but what has been done can still be done and will be. One who has been through it has the right to say it, and these men can be found to-day, and they are not few in number either. The work will be slow and hard. It may take you five years before you can get on your feet a bit, but your time has been well and profitably spent; indeed, you cannot improve land and make a home on it without making it worth much more, and sometimes the increased value will mean more than you could have earned in any other way.

"Starting farming under these conditions means a good deal of hard work, but it will not be drudgery. No; the little you achieve will help you to achieve more, and hope bears onward. No one can write details for the resourceful man; he could not write his own plan; he works it out as he goes on his way, and deals with things as they turn up, and sometimes in a way that is surprising to himself. Some will tell us there are privations without number. Not so; the course I advise may mean I wear my best Sunday suit five years instead of two. Never mind that; wear it on the Sabbath and keep and improve the Sabbath to the best of your ability. Make the district in which you live the better for your being in it, in an all-round sense, and the very stand you take will help you to a position you would not gain without the launching out on your own. One thing is often a difficulty, that is where to find the land. Go to the Land Office, where you readily obtain the information you need. Have a look at the land offering, and if you are not sure of your own judgment find someone to advise you, someone in the district where you intend settling if you can. Farmers, as a rule, are glad to help one who is trying to help himself."

Mr. Kenny (Colton)—"The paper says 30lbs. of seed to the acre. Is that enough?"

Mr. Summers—"Scrub lands."

Mr. Kenny—"My opinion is that the quantity should be 60lbs. and not less."

A Delegate—"It all depends on the varieties."

Mr. W. Heier (Merghiny)—"Thirty pounds of graded seed instead of 60lbs. of ungraded seed is plenty for scrub lands."

Mr. D. Lithgow (Redhill)—“Mr. Dall's paper is a very good one. Young men to-day are not willing to start on such small means as Mr. Dall suggests. They want to start where their fathers left off. Many successful men have started on smaller means to those stated by Mr. Dall. I know of a man who took up a small block, chopped down the scrub with an axe, burnt off a bit, and managed to get a stump-jump plough and three horses. He reaped 1,100 bags of wheat, put in and cut down by himself. He has since gone to Victoria where he took up more scrub land and eventually retired.” (Applause.)

Mr. Holdsworth (Davenport)—“I liked the breezy note of optimism running through the paper. It is an incentive to take the bull by the horns, use your initiative, and help to make the Commonwealth what it ought to be. (Applause.) What we want is this—men of sane minds and strong bodies. There is a great future for Australians. (Applause.) We have proved that we have initiative. Let us take advantage of opportunities. I know men in South Australia who have saved on 25s. a week instead of spending it on whisky. I would like to see a different system of settlement on the land. I believe an immigrant gets a better show than the young men we have here. (Applause.) We want to get out of a rut and realise that we have an objective ahead instead of a wages board.” (Applause.)

Mr. Dunsford (Redhill)—“No living being under British rule could start farming on £100. The amount is far too small. The first part of the paper is not workable; but I agree with Mr. Dall, that an experienced man with £450 may make a success of farming. I have a letter from a friend in England who says he has £500 and wants to come to South Australia to start farming. I am writing back to say ‘This is God's own country, come.’ (Applause.) My advice to him is to put the £500 in a bank and go on a farm to get experience first.” (Hear, hear.)

Mr. F. J. Dayman (Parrakie)—“I cannot agree with the previous speaker altogether. A little over four years ago I started farming with only £100. I bought a team and got the rest on tick. To-day I could sell out for £3,000. (Applause.) At first I lived in a tent and my wife joined me. I worked for farmers, and as I got the chance worked on my own block. Now I have a good farm, all the implements and stock to work it, and a stone house to live in that I built myself.” (Applause.)

Mr. A. J. A. Koch (Lameroo)—“I support the previous speaker. What Mr. Dayman did plenty in the Pinnaroo district have done. I know a man at Pinnaroo who 30 years ago was working on a farm on the Peninsula for 9s. a week and keep. He saved enough to get a start on the Murray with two others, who subsequently left him in the lurch during a dry season. He struggled along for 10 years, some seasons getting only 2bush. By sheer hard work he got straight, and to-day is in an excellent position.” (Applause.)

Mr. W. Mitchell (Geranium)—“Four years ago I went to the Pinnaroo district under the same conditions as many other fellows, and to-day I am in comfortable circumstances. Pinnaroo is coming to the front because many of the settlers have hearts as big as well buckets.”

Mr. A. Hughes (Woodside)—“My advice to young men with £100 is to go to work for two or three years and get another £100 or £200. We are in the midst of good seasons. If you went to Pinnaroo 20 years ago a heart as big as a well bucket would not have been any good, nor one as big as a hoghead. (Laughter.) We have had bad times in the Far North and Murray Flats particularly, and without being a pessimist, history will repeat itself. Certainly with manures droughts wont be so severe, but manure wont fill bags with wheat if there is no rain. Better men have started on twice £100 and have gone to the wall. I hope the country is going to prosper, but we must not be too sanguine.”

The Chairman—“Perhaps we shall have bad times again, but we are better prepared to meet severe conditions. (Applause.) You will remember that Professor Lowrie told us that we could conserve 4in. of rain from one season to the other. I can highly recommend Mr. Straybridge's report on dry farming—it is most instructive. What we must do is adopt advanced methods of cultivation and conserve water.” (Applause.)

Mr. Miller—“I went on the land when I was 16. I used a single plough, and reaped with a reap hook. You must not be afraid of hard work. As regards the quantity of seed, I think half a bushel of clean, well-graded early wheat on mallee country will yield as much as a bushel of ordinary seed if the land is in good condition. Thirty pounds should be sufficient for a 30-bush. crop.”

Mr. Lee (Clare)—“The share system is a jolly good thing for a young man of limited means. I know a young man who got 100 acres on easy terms, purchased three horses, and is doing work on the share principle. He anticipates a return of 20bush. from a fairly large area on this share system. At the same time he has his own land in fallow. He has cleared enough to build a house. When he is not working on his own farm he gets a job somewhere else. I advise every young man to join the Agricultural Bureau. I appreciate the advice I have got from attending meetings. (Applause.) Absolutely the best class of men join the Bureau, and men of experience are always willing to assist young fellows. (Applause.) These meetings are exceedingly inspiring, in fact, almost exciting at times.”

Mr. F. Coleman (Saddleshworth)—“I live in a district acknowledged to yield the best average to the acre, except Grey county in the South-East. Yesterday I received a letter from an English friend—a young farmer in Derbyshire—stating that he wishes to emigrate with capital. I have replied in most favorable terms. In our district some of the larger farms and estates are being divided, and it is in that direction we must look for development.

In view of the unfavorable seasons that must come it will be necessary to cultivate our rainfall country more. We want to keep our young farmers. (Applause.) I think 30lbs. of good seed enough for light rainfall areas. We sow a bushel an acre; but we have a 20in. rainfall. It depends largely on the seed. Mr. Dall's paper is a practical one, and will do good."

Mr. Summers—"Frequently we have inquiries in the Department from young men wishing to start with small capital. I have met many farmers who are now in comfortable circumstances who have started with very little capital. After getting a bit of land they have taken work for their neighbors to keep themselves until their own crops were ready for harvest. I may, of course, have struck all lucky ones, but I don't think this is the explanation. In South Australia, with a start of £300 to £500, there are opportunities you will not get anywhere else in the world. (Applause.) Within the last three weeks we have had several inquiries from men with small capital for particulars of South Australian conditions. My reply has been somewhat on the lines of Mr. Dall's paper. I would like to have a resolution or a show of hands as to whether hardworking young men with £300 to £500, and a little practical experience, may reasonably expect to make a comfortable living as indicated by Mr. Dall."

Mr. J. O'Donohue (Amyton)—"I started farming with £27 and a debt. I reared 12 children, and to-day I have about 3,000 acres of my own." (Applause.)

Mr. Bayne (Pine Forest)—"If a man is pushing it is possible for him to make a start at £100. He will do very well if he perseveres."

Mr. McColl—"Mr. Summers was right in advising inquirers as he did. South Australia is the place to start farming, provided the men have some experience and determination to succeed. The advice in the paper is very good. I worked for other people until I had sufficient capital, and I am now in a very comfortable position. I am sorry more people have not joined the Bureau, because at the meetings you gain encouragement and knowledge."

Mr. S. O. Smith (Angaston)—"We are fruitgrowers, and there are many opportunities for young men in the district. We have an instance of young men tackling and overcoming fairly tough propositions. A banking account has succeeded a mortgage. (Applause.) The keynote of the paper is—'Where there's a will there's a way.' We must not imagine that we are better men than our fathers were. We can do better, and we should do so. In our branch of the Bureau we have a limited membership, but every member is enthusiastic, and regards his association as an honor. (Applause.) I think we have the largest attendance every year, and we have the most drastic rules."

A Delegate—"Why limit the membership?"

Mr. Smith—"Because we reckon that a few enthusiastic members are better than a large number of indifferent members." (Applause.)

Mr. Billinghamurst (Crystal Brook)—“The paper is so important that, with the comments on it, it should be sent to the Agent-General for publication throughout Great Britain. There may be many young farmers who could raise £300, £400, or £500, and might be anxious to come out here instead of struggling on in the old country.”

Mr. Dall—“My paper was written from personal knowledge and experience of our conditions. Regarding seed wheat, you take 30lbs. of sound, graded wheat, and sow as much of ungraded seed on an acre and see the result. Go into a crop you have sown for hay, and it is fairly thick. If it is in the dry weather you will find a good many of the stalks have matured and come up well. Pull up a few of the roots, and you will see, perhaps, as many dwarfs dead—the result of want of moisture. The land has too many plants to carry. There are hundreds of men in the country who have succeeded on the lines laid down in my paper.” (Applause.)

Mr. Summers—“I would like a show of hands as to whether a young man with £300 or £400 can start farming with an assurance of success.”

Mr. Billinghamurst submitted a motion in terms of Mr. Summers' appeal and with the addition “That the paper and comments be sent to the Agent-General for circulation amongst all the English, Scottish, and Irish papers.”

Mr. Holdsworth—“I second the motion.”

The motion was carried unanimously.

EXAMINATION OF STALLIONS.

Mr. F. D. Bladon (Belalie North) initiated a discussion on the examination of stallions. He said—“I have no desire to condemn the present system. I firmly believe that the originators had a good object in view. There are a few disadvantages under which horsebreeders are placed by the present system, which, if adjusted, will materially assist the industry. Under the present system examination parades are called for in the country towns. Now, to show the disadvantage of this, I shall take an example. Supposing I come to the annual horse sale in July and buy a horse for £300. I take him home, and three months afterwards I bring him up for examination. He is rejected. This is a total loss to me. If these examinations were made at these annual horse sales in Adelaide it would be of mutual benefit to the State and the breeders. A man would know what he is buying, and it would prevent South Australia being a dumping ground for all condemned horses from the other States. Another disadvantage is that the present system is not a sufficient safeguard for the interests of the breeders. It does not warrant a man buying a £300 horse for stud purposes. You say why? Because if he does there are so many farm-bred horses kept that he will not obtain sufficient service for the horse to warrant his keep and groomage. Farmers are not going to pay a travelling horse £2 10s. or £3 3s. for his service

when he can obtain the service of his neighbor's horse for 30s. I claim that the breed will under the present system deteriorate. What is going to be done with the condemned horses? They are going to be bought by northern breeders and taken where an examination is never thought of, and their progeny will be sold to us with all kind of diseases. What is the use of condemning a horse if he is still to remain a sire? Tax all horses £10 a year. If a horse is not worth £10 a year then put him in the plough, where a good many should be at the present day. Another disadvantage of the present system is the required production of a horse's ancestors' breeding prior to examination. If the ancestors of a horse were condemned for an hereditary disease your horse would be subject to a keen examination and would undoubtedly be condemned too. Let a horse be condemned on his own merits, not because of his ancestors. The certificate should be produced when the horse has been examined, and not before."

Mr. Brock (Johnsburg)—"A man who can afford to pay £200 or £300 for a stallion can afford to pay for a veterinary examination." (Hear, hear.)

Mr. Dawkins (Gawler River)—"A man is foolish to purchase a horse without an examination by a veterinary. (Hear, hear.) Unsound horses must not be allowed in from the other States, and by stopping that the breed in South Australia will be greatly improved. It would be fair for every horse to undergo examination. There should be from five to seven years to give owners of unsound horses a chance."

A Delegate—"What about the mares served in the meantime?"

Mr. Dawkins—"Reforms have to work slowly. Any horses under two should be operated on unless they receive a certificate. A small tax on stallions would only keep down a few weeds."

Mr. Nairn (Stockport)—"Do 50 per cent. know what ringbone or sidebone is? These troubles condemn the majority of horses. Are we going to condemn 90 per cent. of our horses because of something the average man cannot find and the veterinary surgeon has a difficulty in finding?"

Mr. S. Eyre (Georgetown)—"I move 'That this Congress approves the system of the examination of stallions, urges the prohibition of rejected horses, and also that no rejected stallion shall travel for public purposes.' Examination was a move in the right direction. The Georgetown Branch has taken an active interest in this subject." [Mr. Eyre quoted extensively from a paper contributed to the meeting of the Georgetown Bureau by Mr. G. Hill on June 25th, already published in the *Journal*.]

Mr. Needham (Chief Inspector of Stock)—"Horses are not allowed in at present without a certificate of soundness."

Mr. Dunsford—"I second the motion."

Mr. Colebatch (Acting Principal of the Roseworthy Agricultural College)—"What we want to do is to provide that rejected horses shall not serve and so transmit hereditary troubles. By giving owners of unsound horses a chance

of two years or more, as has been suggested, you will allow scope for injury. A stallion tax might be initiated, not as a means of revenue but as means whereby the difficulty might be overcome. I am perfectly confident that the scheme is not going to work unless you have an insurance scheme against loss of certificate. That could be satisfactorily worked out in the light of past experience. We know the percentage of three-year-olds that are likely to be rejected as four-year-olds, and provision can be made against probabilities."

Mr. Bodey (Mount Gambier)—"The question arises as to who is to be the judge in these matters. My stock will compare favorably with any in South Australia, and I would not take second place to any boy vet. (Laughter.) I have seen the best horse in the show ring rejected and the vet. could not show the defect. In Victoria 500 farmers discussed this question at a meeting, and they were overwhelmingly opposed to it. It will be a great mistake to place any embargo as suggested. To hear many young fellows talk about diseases you would think that two-thirds of the stock in South Australia was valueless."

Veterinary Surgeon McEachran—"The regulations at present in force are practically the same as those in Victoria. Victorian certificates are recognised in South Australia. Rejected horses may be examined on appeal. We welcome appeals. We pay more attention to unsoundness and not so much to markings of a horse."

At the suggestion of Mr. Holdsworth the discussion was held over until the delegates had heard Mr. McEachran's address at a subsequent session.

Afternoon Session.

The President of the Advisory Board of Agriculture (Mr. J. W. Sandford) presided.

MOTOR TRACTION ON THE FARM.

Mr. W. Hunt (Whyte-Yarcowie) opened with a paper on "Motor Traction on the Farm," as follows:—

"It is over 30 years since the traction engine became a success, and for a number of years it was used for hauling heavy farm machinery from one job to another, and for hauling on the roads. Of late years the tractor has been greatly improved in construction and efficiency, and has taken the place of both men and animals. They are now extensively employed in America, not only for breaking the land, but also for discing, seeding, cutting grain, &c. The first traction engines used for ploughing were the ordinary steam threshing engine, built primarily for belt service, and their use

involved numerous expensive breakages and many discouragements. The tractor of the present day is made more substantially, and steel or semi-steel gearing has been substituted for cast iron. The service required of it is so severe that no engine can be successfully used for this purpose unless especially designed for it.

"If the traction engine is to attain an extended use on the farm, it must be so constructed that it may not only be used for ploughing, but for cultivating, seeding, harvesting, and haulage on the roads. The tractor will be able to find the broadest field of usefulness when it will not be a machine to be used only during certain seasons, but will be of service through the entire year, and it is gratifying to know that manufacturers have already turned their attention to this class of tractor with varying degrees of success.

"Successful traction work depends upon three factors—first, the selection of the outfit; second, the management of the outfit; and third, its cost. Upon the selection of the tractor and the machines it will have to operate will depend the success of the whole outfit. The points which must be determined in making a selection are size, weight, adaptability, convenience, economy, durability, and cost. The size of the tractor is largely dependent upon the size of the fields and the condition of the soil. In general, the size may be in direct proportion to the size of the fields. The largest fields offering the best condition for the largest outfit, and the smaller field limiting the size. The condition of the soil may be an important factor. If the fields be rough, cut out with streams or ponds, or if the ground is level but soft the smaller and lighter outfit may be desirable. Weight is necessary in order that the engine shall have the proper adhesion to the ground that will enable it to pull its load. On the other hand more weight than is needed means poor economy. Often over 50 per cent. of the power of the engine is required to propel the tractor itself over the ground. Although a certain amount of weight is necessary the tractor should be as light as possible.

"The adaptability of an outfit may be covered largely by the size and weight; but there are a few other features, independent of these, which will determine the merits of a tractor for certain conditions. One should be selected which will burn the fuel at hand. Some of the most economical engines on the market will not burn a low grade fuel successfully. If a good grade of fuel is not at hand this type of engine should not be considered. For soft ground the engines with high driving wheels and wide tyres are the most desirable; or, if the ground is very soft, the caterpillar-tread tractor will be the best suited for the purpose. The convenience of an outfit will determine the cost of operation to a large extent. At the present time labor is an expensive item, and if labor can be reduced to a minimum the cost of working per acre will be greatly reduced. The tractor, to succeed on the smaller farms must be a single-man outfit. It is the matter of convenience and reduction of labor that has given to the oil tractor its present field.

"It is rather difficult to get a line on the economy of the various engines on the market. There is no doubt that some engines are far more economical in fuel than others. There is such a wide range in the consumption of fuel that one engine may be worked at a profit while another, under the same conditions, will result in a loss. In practical tests it has been shown that the cost of the fuel consumed in ploughing an acre of ground varied as much as 2s.—a splendid profit in itself. Durability depends almost entirely on the amount and quality of the material used in construction. Experience has not yet indicated how long an engine will last. Possibly a well-proportioned ploughing engine would last 10 years.

"I will point out some of the advantages and disadvantages of steam traction, oil traction, and horse-power. Although the steam engine has achieved success it is hampered by many inherent difficulties. In the first place it requires a large force of men and horses to keep it in operation and to supply it with fuel and water. It is not uncommon to hear of steam-ploughing outfits at work where three four-horse teams are required to keep them supplied with fuel and water. Localities seem to be unknown where two teams are not required for this purpose. The engines stand idle at least 20 per cent. of the time taking in coal and water. The steam-ploughing engine is also hampered by its excessive weight. Such engines, whose working weights are 36,000lbs. to 40,000lbs., being not uncommon. There are large areas of territory where such weight cannot be transported over the fields without driving wheels of excessive width, which makes it difficult for the engines to turn and manœuvre. They are too risky to use in the harvest fields in this State on account of the danger of fire. The power plant is very flexible and gives off power very steadily.

"The oil tractors compared with the steam engines of the same rating are much more substantially constructed, but weigh much less. They use cheap kerosine and petrol for fuel, and the supply tank generally holds enough fuel for a whole day's run. They are safe to use in the harvest field, being free from the danger of fire, and also from danger of an explosion, unless a light happens to get in contact with the petrol. The oil tractor can go on the land earlier than the steam engine after a rain, but they cannot go on as early as horses can. The petrol tractor can start work as soon as the engine is started; whereas a steam engine has to wait a considerable time to get up steam. Only one man is necessary to operate an oil tractor, and the engine can be run a whole day without stopping, providing it has an efficient radiator.

"No tractors can be successfully used for ploughing on swampy, marshy ground and on hilly ground their effective power rapidly decreases.

"The horse has a few rather serious disadvantages. In the first place he cannot work very long without getting tired, and in the second place he must be fed, whether he is idle or at work; whereas the tractor is tireless

and can work day and night. One great advantage the horses have over the tractor is that they can be worked in teams of any number to suit the work to be done. A tractor, unless it is working at nearly full load, can seldom be profitably used. The horse can be got on the land after a rain earlier than a tractor, but the tractor will completely outdo the horse under hot and dry conditions. Experience seems to have proved that the traction engine can do any work that the horse can do, providing that the conditions are favorable. They seem to be able to do it as cheaply. They can do better work and do it in a shorter time than horses can. It is risky to prophesy, but if before another decade has elapsed the horse has not been largely replaced by oil power on large farms the writer will be much surprised."

A VIGOROUS DISCUSSION.

Mr. W. R. Stephenson (Artherton)—"It would be of great assistance if anybody present could tell us from his own experience what these motor tractors are capable of doing. We cannot afford to experiment ourselves, and I have heard some men say that while they are all right for drawing heavy loads on the road, they have not proved very successful for ploughing and other purposes on farm land."

Mr. Lock (Whyte-Yarcowie)—"There is no doubt that with the present price of horses we must do something to replace them as far as possible. Some time ago I saw a motor tractor trying to plough, but it did not succeed too well. Nevertheless, I think the day is coming when motor tractors will be used extensively on the farms, although it will undoubtedly be many years before they take the place of horses."

Mr. Lecky (Davenport)—"Although I have seen failures with steam tractors I am convinced that in the not far distant future motor tractors will largely replace horses and bullocks in connection with farm operations. So far as I have been able to gather, however, there is still much to be done in the direction of perfecting the motors."

Mr. F. Coleman (Saddleworth)—"I believe the Ivel agricultural motor has been more or less successful. Some time ago the Roseworthy Agricultural College imported an agricultural motor which I understand proved to be a failure. In any case the farmers should have been given more information concerning it, so that we would have known whether to be cautious or go ahead. It would be a good plan for the Agricultural Department to make inquiries regarding the Ivel motor, which, I think, would do good work out here, and supply us with some reliable information about it."

Mr. J. W. Dall (Northfield)—"A tractor was tried near to Northfield three years ago, but everybody who witnessed its performances came to the conclusion that it was a failure. I have heard of cases where two engines, fixed stationary on opposite sides of a paddock, have pulled a plough across

by means of cables, and have done satisfactory work. Still, farmers should seriously consider before they go in for tractors of any kind."

Mr. Kenny—"I know of a couple of traction engines introduced into this State a few years ago at a cost of £700 each that can be bought to-day for £100 apiece. I have great faith in motors for such work as winnowing, chaff and wood cutting."

Mr. Lock (Keith)—"Traction engines were employed at Tintinarra a few years ago, and worked well until the land became wet. Then they buried themselves. The time is coming, though, when motor tractors will be all right for the farm. The present difficulty seems to be to get engines that will grip the soil."

Professor Angus—"I think it was due to my influence, to some extent at any rate, that the Saunderson motor was brought to Roseworthy College. Mr. Coleman says rightly that the motor was a failure. He complains, however, that information which the farmers ought to have had on the subject was not given. In that respect he is quite in error. Professor Perkins furnished an exhaustive report concerning the machine which, I believe, appeared in the *Journal*—(Delegates—Hear, hear)—and personally I read in the daily press how it had acted. I think we have got into confusion about the agricultural motor. There is no doubt about the success of the steam traction engine for ploughing on light land. There are two methods—the stationary, and that in which the engine draws the plough along with it. It is possible with only one engine to work a two-way plough across a paddock. The difficulty in this case is that in hilly country the cable gets into trouble. Of course I am speaking of British made engines. They cost money. Coming to the motor tractors, there are half a dozen different makes on the market. At a trial in Canada recently a motor successfully hauled a 15-furrow plough 4½ in. deep on stubble. Surely a similar engine could do the same work here. Some months ago, when the Government decided to establish a dry farm at Minburra, I recommended that a motor should be purchased for use there. The then Minister (Hon. T. Pascoe) cabled to Professor Perkins to report on two of the motors on the market, and he has written very favorably concerning the Marshall engines, one of which I believe will be at work in Adelaide within the next three months." (Hear, hear.)

Mr. Coleman (Saddleworth)—"The Secretary of my Branch has been asked to supply information about motor tractors to two men in the district who are prepared to give between £400 and £500 each for a machine if it can be guaranteed."

Mr. J. Miller—"Would the use of the motor tractor be labor-saving?"

Professor Angus—"I do not think the American farmer would be utilising the motor tractor as at present if there was not something to be gained by doing so. There is being made in America to the order of an Australian firm an Avery motor tractor which it is claimed can plough an acre of land

for something like 3s. 2d. We cannot do that with the prevailing price of horses, feed, and labor in South Australia. If we could do it for 4s. we would be fortunate."

Mr. W. L. Summers—"Are motor tractors safe to take into the harvest field, under local conditions? (Professor Angus—"Certainly.") The makers of the Marshall tractor guarantee their 30-35 B.H.P. machines to displace 12 horses. The machines cost £440 in England, and are capable of ploughing six furrows 14in. wide and 6in. deep at a cost of about 3s. 1d. an acre. There is a larger machine which costs £700. In his report on this make Professor Perkins believes that if altered to suit certain local conditions the tractors will offer a good prospect of success. The big machines are able to deal with strips 10ft. and 14ft. wide at one operation. What we have to bear in mind, however, is, will a machine, even if it ploughs economically, pay unless it can be operated with absolute success in the harvest field?"

Mr. Billingham (Crystal Brook)—"A motor tractor was tried at Crystal Brook some time ago. We had been led to believe that it would travel at four miles an hour, but on the day of the trial it did not exceed more than two and a half miles. Apart from the slow travelling and the fact that it was stopped every now and again, it did fairly good work."

AGRICULTURAL LABOR.

Mr. W. L. Summers (Secretary to the Advisory Board of Agriculture) initiated a discussion on "Agricultural Labor." He said—"One of the most important problems confronting the agriculturist to-day is the supply of competent farm labor. It is a question which must be studied from different aspects, and one which undoubtedly is difficult of solution. On the one side we have a fairly general complaint that reliable workers with a knowledge of agricultural work are difficult to secure, while on the other there are the questions of wages, hours of labor, and the accommodation provided for farm laborers. Upon the solution of this problem the development of our millions of acres of scrub lands largely depends, and no excuse is needed for bringing the matter before this agricultural parliament. I do not propose to attempt to solve the problem myself, but to ask the members to discuss the question from their point of view, and to suggest means for overcoming the difficulty. There can, of course, be no doubt that when the agricultural laborer can to a certain extent pick and choose, relatively high wages and comfortable living conditions will be demanded, and no one can fairly blame the worker for obeying the laws of supply and demand. There is also no doubt that it is cheaper to pay a good man good wages than to be dependent upon indifferent workers. It must not be forgotten that a competent farm laborer is a skilled worker, and expects to be paid as such. One of the difficulties we have to overcome is due to the great demand for

harvest labor extending over a relatively short period. Good workmen are naturally not satisfied to remain as 'casual farm hands,' and anything that can be done to make employment on the farm more constant will help to solve the problem we are discussing. In this connection I would commend to members of the Bureau the thoughtful paper read by Mr. G. A. Block, and published in the August issue. To what extent farmers as a body are able to follow his ideas in this respect I am not able to say, but there is a great deal in his contention that it will pay the farmer to make things as comfortable as possible for his employés. While it must be admitted that over a large area of this State wheat-growing, with its attendant large demand for labor over a limited period, must for many years be our chief crop, I believe that generally we could practice mixed farming to a greater extent than at present. By marketing a large proportion of the farm crops in the form of meat, butter, &c., the labor would be distributed over a greater period, with the result that the rural workers would be more settled, and there would consequently be a large number of lads used to farm work available throughout the State. There are two suggestions to which I would particularly invite attention and discussion. The first comes from Shannon Branch, and it is that the Agricultural Bureau should work in co-operation with the Labor Bureau in regard to requirements of farmers for labor. With Branches distributed all over the State there should be no better means of gauging the actual requirements of each district and of the State as a whole. The mode of procedure suggested is that members of each Branch should, through the secretary, indicate in ample time before harvest particularly and at other times during the year their needs as to labor. In doing this it would be necessary to indicate (1) the nature of the work, and whether experience in any particular line is necessary; (2) the wages offered and general conditions; (3) how long the job will last, and the prospect of more permanent work for competent men. With this information at hand the Labor Bureau would be in a position to say in the case of harvest hands whether sufficient labor was available, and in a general way endeavor to meet these and other requests. With some system of this nature in operation men desirous of farm work and the farmers themselves would undoubtedly make more use of the Labor Bureau. The publication by the Bureau of the information needed would also attract workers from other parts when local labor is insufficient to meet requirements. The other suggestion I refer to is the establishment of training farms for boys. Most of you heard the Minister's remarks last night, and it is unnecessary to go into details of how the proposal is to be worked out. The general idea is to give lads from the cities sufficient practical training in the use of the usual farm implements and in the handling and feeding of stock to make their services of value to farmers and other producers. In doing this two purposes will be served—meeting a demand for labor, and removing to healthier conditions a proportion of the coming genera-

tion which would otherwise remain in city under conditions not so good from either sanitary or moral standpoint. In Victoria and New South Wales much success has been achieved in this work, and there is little doubt that if the proposed training farm here meets with the success anticipated it will be only the forerunner of training farms where young men desirous of going on the land and newcomers having the same object in view will be able to obtain 12 months' experience in farm work before starting on their own account." (Applause.)

Mr. Lloyd (Kingston)—"The points put forward by Mr. Summers are deserving of the most serious and careful consideration. Personally I have in mind a scheme whereby farm laborers might be provided with holdings on which they could plant trees and keep a few cows and poultry while not engaged by the farmers in the neighborhood. At present suitable men have no inducement to go into the country to serve as farm laborers, for they can do as well where they are."

Mr. Block (Freeling)—"We must find 'side lines' to keep the men necessary on the farm regularly occupied on the property; in other words, we must supply them with permanent employment. This is the only way we can effectually solve the existing problem. We want young men on the farms, but we do not want them brought here by the Immigration League. We should do as the late Mr. Angas did—bring out our own assistants. By means of co-operation an agent could be sent to England and select all the labor necessary, and see that only suitable men were secured."

Mr. Whitacker—"If the Bureaus took the names of persons willing to work on farms at harvest and other times it would be a good plan. The proposal to train lads for farm work is excellent, and I hope it will be carried out. There are hundreds of boys in the city who would be better if placed on the land, and there are many farmers who would employ married men all the year round if only they could get them." (Hear, hear.)

Mr. W. F. Nicholls (Narriby)—"It is questionable whether some of the lads in the city would make good farm hands; nevertheless the farmers would be foolish if they failed to back up the Minister's scheme."

Mr. J. W. Dall (Northfield)—"It is not right to ask a farmer to pay a young fellow 10s. a week and board him at a cost of perhaps 15s. a week when there is every probability that he may not be worth it. Young men anxious to learn farming should be prepared to go to a farmer and say, 'Take me on and give me what you consider I am worth.'"

Mr. Holdsworth (Port Augusta)—"What is necessary is to make the farm laborers' occupation a profession and raise the status of the men. Make it worth while for men to undertake the work and you will have little trouble in getting suitable hands. Many men in the city are ready to go out as farm laborers, only they say that they would have to keep two homes. Not only should training farms be established for boys, but when each new hundred

is opened for settlement a portion of it should be reserved for agricultural laborers to settle upon."

Mr. Dawkins (Gawler)—"The firm I am associated with has adopted the system of providing homes on the property for the employés to live in. The difficulty is that the wives of the men from the city when they get into the country become dissatisfied."

Mr. Eyre (Georgetown)—"If the Minister will only go into the country he will find there plenty of poor children who would be glad of an opportunity to receive farm training, and as they are accustomed to the country there is more likelihood of their staying there and proving successful agricultural laborers than city boys."

Professor Angus—We, as farmers, should realise that we must train the men who are to be our laborers. I think our farming is pretty well mixed as it is. Why not, as some of the speakers have suggested, have small holdings for the farm hands? They have been the salvation of the old country, agriculturally speaking. At present the position of the married men on some of the farms is not all that might be desired. Training farms are excellent institutions, but they are only as a drop in the bucket. What are 50 or 150 boys a year going to do toward solving the labor difficulty? Why not training farms for young men? At the same time I think we should give the Minister every support in the project which he outlined."

Mr. Holdsworth moved—"That the recommendations voiced by Mr. Summers be indorsed by this Congress, and that the Advisory Board of Agriculture be asked to prepare a scheme for the training of men on farms, and the allocation of agricultural areas for the residential accommodation of farm laborers." (Applause.)

Mr. Dawkins seconded the proposition, which was carried.

Mr. Summers—"The proposal put forward by the Minister is only a beginning. If it should prove successful there is no doubt that it will develop into training farms for young fellows of more mature years."

EVENING SESSION.

Mr. J. W. Sandford in the chair.

SOME SEEDING PRACTICES.

The Acting Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. (Agriculture), M.R.C.V.S.), delivered an address on this subject. He said—"I have chosen a practical subject this evening, and I anticipate a good deal of criticism. With the exception of a passing reference to spring seeding in the South I shall confine my remarks to autumn operations, and for the most part to the sowing of our main crop, viz., wheat.

"In all countries where the main feature of the agricultural operations is the growing of crops—be it grain crops or forage crops or both—the methods

adopted for the preparation of the land, sowing of the seed, and for treatment of the crop during the initial stages of growth are of the first importance. In many parts of Australia, and especially of South Australia, these considerations are of even greater moment—not only to the individual farmer, but to the whole community—than in more favored countries, *e.g.*, Europe and New Zealand. This is brought about by the character of the climate, which is remarkable for the long, comparatively dry and relatively hot summers, the short and varied autumn and spring seasons, and the relatively mild winters. In Europe and New Zealand, owing to the more even distribution of the rainfall, seeding may take place in the autumn or in the spring, so that in the event of autumn sown fields failing, or if the autumn proves too wet to enable the seed to be got in, the leeway may be made up in the ensuing spring, and in this way the farmers in these favored countries are saved the loss of a year's crop. Over the bulk of South Australia, however, and, for that matter, over very large areas in New South Wales, Victoria, and Western Australia, farmers are restricted to autumn seeding, at any rate as far as the main crops—cereals—are concerned. Further, the seasons are very variable; and even at the best there is little enough time available for the sowing of the seed under conditions that are likely to favor a rapid germination and subsequent vigorous growth. Over the great bulk of the wheat-growing area in this State only eight to nine weeks is included in what may be termed the normal seeding season; and when this is too frequently broken into by heavy showers it is quite impossible to cope with the work within the time referred to. Should mistakes be made, however, as they undoubtedly are, for none of us are infallible, it is not possible to recover the lost ground, and we have to be content with a summer crop of sorghum or maize, or, may be, a crop of pease or such grass as will come naturally on the land with the advent of spring. For this very cogent reason, on the one hand, and because of the early appearance of the dry summer months and the frequent absence of appreciable rains in the spring, the Australian farmer has been driven by the spur of necessity to make a very close study of the relative merits of the various seeding systems available to him, and is ever awake to the possibility of improving those at present in vogue. Even within the confines of our own territory we are confronted with widely differing weather conditions. And, since in a large measure the climate determines the system of sowing, it follows that the seeding methods will vary somewhat according to the district. But there are many other factors besides climate affecting this subject.

FACTORS INFLUENCING SEEDING METHODS.

“1. *Climate and Rainfall.*—According to the amount of heat registered during the growing period the type and species of crop will vary—thus, oats, barley, and rye are preferred in very cold parts, whereas wheat is pre-eminently

the crop adapted to hot climates. It also withstands drought better. The abrupt change from winter to summer makes it impossible in Australia to sow the spring varieties in the spring, and moreover, for the same reason, the really late and slowly-maturing types of England and Russia, from which the heaviest yields are obtained, are of very little value here. Thus we are driven by our climatic conditions to fall back on the autumn sowing of spring wheats which have been classified into early, medium early, and late groups according to the rate at which they mature under South Australian conditions. The rainfall is frequently taken as a rough index of the adaptability of a district for the growing of crops, but so far as wheat is concerned this should only be considered in relation to the temperature. Where the average temperature is high a considerable amount of moisture is lost through evaporation and transpiration, and therefore a higher annual rainfall is needed to produce profitable crops than in the case of a district of low temperature. It is important to bear this in mind when comparing results obtained in districts of equal rainfall, but situated in different parts of the globe. It also has an important bearing on the seeding methods to be adopted in districts that lie on the margin of cultivation. In South Australia the best seeding conditions are obtained when good heavy rains fall towards the latter end of March and early in April, with timely showers throughout the next two months. This gives a nice, moist tilth, encourages rapid germination, and leads to the deep rooting of the crop before winter sets in. A dry autumn presents much difficulty at seeding time, but if the winter be wet and the spring moist the crops may still yield well.

" 2. *Soil*.—The physical condition of the soil and subsoil are not without effect on sowing methods. The lighter types of soil generally cause earlier germination than the clays, which are relatively colder and more retentive of soil moisture. In some districts every effort is directed to the working of the land in order to conserve this moisture; whereas in parts of the South-East soil drainage is the all-important consideration. It frequently happens that the mechanical condition of the land is such that, although the conditions for germination are favorable, the subsoil is too wet for the teams to work on it without 'poaching' the land.

" 3. *The 'condition' or available fertility* of the land will affect the amount of seed and manure and the cultivation of the land in preparation for seeding.

" 4. *The previous treatment* of the land will also influence the farmer. The nature of the preceding crop and stubble bears directly on the choice of seeding system.

" 5. *The kind of crop to be grown* and the *use to which it is to be put* must be considered important factors as influencing the kind of seed bed required, time of sowing, and cognate matters.

" 6. The average return for the district and the acreage to be sown must be mentioned among the minor considerations.

" 7. The natural desire for immediate returns with the minimum of expenditure is to a large extent directing the primitive methods practised in the newly settled areas. These practices, it is hoped, are but temporary measures, which will be replaced by more rational farming methods at the earliest opportunity.

" 8. Last, but most important of all, is the influence of the particular season in which the operations are to be carried out.

PREPARATION OF THE LAND.

" When speaking on this subject a few years ago to a meeting constituted similarly to this one, Mr. R. Marshall prefaced his remarks thus:—First, I may say that I am dealing only with the treatment of fallow land, as I do not believe in sowing anything but fallow. A straightout statement like this by one of the most successful farmers of the State commands the attention of us all. The foundation rock on which the seeding operations in this State are based is the fallowing system, and it seems to me it would be wise for us to pause awhile and consider whether or not the kindly seasons and high yields which have favored us during the past few years have not led us to neglect our winter fallows. The satisfactory returns that have been obtained from stubble land by the aid of timely rains, selected seed, and phosphatic fertilisers must tend to divert attention from the all-important work of early and thorough fallowing. The fear that the series of fat years may give place to droughty seasons has, no doubt, induced farmers to shorten the ordinary course of rotation and bring under crop land that would otherwise have been rested two, or even three, seasons and then fallowed before being seeded.

" The influence of thorough tillage without manure is shown below in comparison with heavy manuring on land insufficiently worked.

TABLE I.

ROSEWORTHY SOILS.—RAINFALL, 18.45 INCHES—TILLAGE VERSUS MANURING.—WHEAT.

Plots 26 and 27. Unmanured--Fallowed alternate years.			Plot 39. Annually dressed with 2cwt. superphosphate, 1cwt. sod. nitrate, 1cwt. pot. sulphate.	
1905.....	25bush.	0lbs.	1905.....	31bush. 26lbs.
1906.....	18 "	19 "	1906.....	6 " 30 "
1907.....	15 "	52 "	1907.....	3 " 59 "
1908.....	25 "	5 "	1908.....	Fallowed
1909.....	23 "	32 "	1909.....	35bush. 41lbs.

"These departures from the established practice must in time, if persisted in, work out their own remedies, for, under our system of cultivation and cropping, we must either become gradually more and more thorough in the fallowing of the land or else be content to lengthen the rotation of cropping if yields are to be increased or even maintained. Apart from the purpose of conserving moisture, which is regarded by many as the most important advantage derived from fallowing, there is the great mass of chemical and biological activities going on in the substance of the soil, and on which we are dependent for available nitrogen and a proportion of the requisite mineral matters. In one of the largest hay-growing districts I am informed by those in a position to know that much of the land that used to produce 3 tons to 4 tons to the acre under the bare fallowing system is now 'hay sick,' and can with difficulty be made to yield 30cwts. per acre. This would seem to point to the fact that the time is not far distant when even a vigorous bare fallowing system will be found insufficient to render soluble the amount of nitrogen required for the production of maximum yields. I instance this as showing that, far from being in a position to contemplate the omission of a fallow occasionally, we are likely to find such preparation for seeding increasingly necessary, and may soon have to make regular use of nitrogenous as well as phosphatic fertilisers.

"The effect of adding nitrogen to the usual phosphatic dressing under Roseworthy conditions is illustrated below.

TABLE II.

ROSEWORTHY.—WHEAT, VARIOUSLY MANURED AFTER BARE FALLOW.

Season.	Unmanured.	Super., 2cwts.	Super., 2cwts.; Sod. Nitrate, ½cwt.	Super., 2cwts.; ¼od. Nitrate, 1cwt
	Bushels.	Bushels		
1905.....	21·91	28·17	—	36·02
1906.....	17·22	20·81	20·85	22·45
1907.....	14·60	14·96	17·80	20·48
1908.....	24·80	38·33	37·76	33·43
1909.....	24·78	31·03	33·66	34·75
Average	20·66	26·66	27·52	29·43
Excess over unmanured plot	—	6·00	6·86	8·77
Cost of manure	—	8s. 3d.	11s. 9d.	£1 2s. 3d.

"There can be no better preparation for a seed bed than a bare fallow if the work be properly carried out. The land should be lifted as early as possible after seeding, or if seeding be delayed and the land is ploughable, it may be started even before seeding. From a theoretical point of view it should be begun as soon as ever the land is moist enough to plough nicely

to a good depth. The reason for this is that every effort should be made to open the land in time to catch the soaking autumn and winter rains.

"The following table illustrates the scheme Professor Perkins has in hand to test the value of different depths of fallow ploughing:—

TABLE III.

PERMANENT EXPERIMENT TO SHOW EFFECT OF DEPTH OF PLOUGHING.—WHEAT.

Depth.	2in.		4in.		6in.		8in.		10in.		12in.	
	Wheat.	Fallow.	Wheat.	Fallow.	Wheat.	Fallow.	Wheat.	Fallow.	Wheat.	Fallow.	Wheat.	Fallow.

After cultivation the same for all plots.

Samples for moisture contents taken before ploughing and every fortnight after it, from depths of 2in., 4in., 6in., 8in., 10in., and 12in.

Samples taken of average soil and of each distinct type of soil.

"Two objections may be made to this early ploughing. In the first place, unless sheep are available, early fallows are apt to become very dirty, and if the land be very heavy and the winter a wet one the growth may get too rank to be conveniently handled in the spring. Under such conditions it is not always feasible to graze it down or even to chaff it up for ensilage, and if ploughed under it makes the seed bed rather too hollow for wheat. The second point is that some types of soil are better not ploughed till later, as they are inclined to set down too hard under the influence of the winter rains. As a rule, the heavier soils should be lifted later than the lighter kinds, as they do not require the same amount of beating down as those of looser texture. Whilst bearing in mind the fact that, owing to the tendency to become water-logged, some soils must be lifted at the first favorable opportunity, it may be taken, as a general rule, that the lighter lands should be fallowed first and the medium heavy types later. The heaviest clays are, with advantage, allowed to lie over till the spring.

"Early fallowing in May, June, and July should be at least 6in. deep wherever the conditions are suitable. In some parts the soil is too thin and crusty to permit of this; in fact, in many parts the surface is so near the stone that it is puzzling to see how the crops grow at all. Again, the subsoil may be too raw and sour to be brought up suddenly to the surface. Nevertheless, I think it may safely be asserted that much of the early fallowing is too shallow, and farmers are apt to think too much of the cost in time and money and not enough of the chief objects of the work. In dry seasons the crops sown on fallows that have been ploughed 3in. to 3½in. suffer from want of moisture, and the roots are unable to get down into subsoil. It is better to vary the depth from time to time to prevent the formation of a plough pan. As the year proceeds spring ploughing takes place, and

this, generally speaking, should be 1in. to 1½in. shallower; for the bulk of the rains are now past, the weathering influence of the frosts and winter weather generally has gone by, and over and above these points, if the spring ploughing be excessively deep it will be a difficult matter to get the seed bed sufficiently consolidated to carry wheat satisfactorily.

"For some years now efforts have been directed to the invention of multiple ploughs, skim ploughs, and disc cultivators for the purpose of cheapening the cost of fallowing; but, whilst these are all useful implements when properly employed, they are not good substitutes for the three and four furrow ploughs, as far as the first ploughings are concerned. They result in a sacrifice of thoroughness and efficiency in the interests of speed and reduced cost.

"It is not generally a wise thing to work the land down into tilth before spring. When left in the rough right through the winter the soil presents more surface to the atmosphere and is more open to let in the rains. Land that is apt to 'melt' down under rains and form a hard surface on drying may even be spoilt by too much autumn or winter tillage, as if not cultivated at just the right stage in spring it may become too consolidated to work before the next good rains fall, and that may not be before the following autumn. Soils of this class are to be found in the Government Experimental Farm at Kybybolite, and when injudiciously managed they settle down as hard as a macadamised road. In very dirty fields, however, if fallowed early the land may be cross-harrowed to get a germination of weeds which can be destroyed before winter sets in.

"Land that has been winter-fallowed should be deeply stirred early in the spring with a chisel-tined cultivator if clean and a broad-tined if dirty, and then as soon as the warm weather sets in it should be lightly worked, say, 2in. to 3in. deep, to destroy weeds and maintain a loose soil mulch or blanket to imprison the moisture.

"The object of the deep cultivation is to stir the lower layers and shake the soil down into a firm, tilthy bed. Fallows prepared in this way and scarified regularly after the summer thunderstorms will provide clean, moist, and firm seed beds, with an inch or so of fine loose soil on the top. If this cannot be accomplished by scarifiers, discs, and harrows, light or heavy rollers should be employed as well. The later the fallows lie the more necessary it is to use consolidating implements.

"By reducing the surface to a fine condition the seeds are encouraged to germinate, and the resulting feed can either be fed down with sheep or destroyed by cultivation. In late seasons, and particularly about harvest time, it is not always possible to keep the fallows clean, and at such times a flock of sheep is invaluable. Since my return to the State I have been surprised that after all these years the advice of a man like Professor Lowrie should have been so little heeded. Large numbers of our northern farmers are without sheep-proof fences on their properties and, therefore, unable to turn their

fallow and stubble feed to best account. I have had two farmers this season offering me sheep feed, and have been delighted to find shepherds for the occasion. As is well known, a large flock of sheep is carried on the College farm, and as several breeds are kept partly for educational purposes, it makes it difficult at times to use them all to best advantage; but no such difficulty could arise on an ordinary commercial farm, and, provided the number of ewes is not allowed to get too high, they are a wonderful help in cleaning and firming the fallows, preparing the stubble and grass fields for fallowing, and topping back over-rank crops in May and June. The only danger is that of keeping too large a flock of lambing ewes. In that case there is a strong temptation to delay fallowing so as to ensure a good supply of grass for the milking ewes. It would be better to lessen the numbers and buy 'flying flocks' occasionally should more be required.

"When a mild open winter occurs the fallows are apt to get very weedy, and it may be necessary then to cross plough 3in. to 4in. deep in the spring with a multiple furrow, or if the growth is very heavy, with a disc plough; but so far as possible this condition should be avoided, as ploughing always means greater loss of moisture than scarifying, and, again, it leaves soil too open.

"It is a mistake to put too much summer working into the fallows, especially in a dry season and on land that has not been sufficiently consolidated in the winter and spring, as it only brings about a dusty condition and increases the risk of 'takeall' appearing later on. All that is necessary in a dry summer is to keep down weeds, as if this be done there will be little danger of the soil crusting over and losing a lot of water by evaporation.

"Although the bare-fallowing system requires large areas of relatively cheap land, increases the cost of producing crops, and leaves the way open for the escape of soluble nitrogen, yet it has many points in its favor which more than compensate for these disadvantages. The absorption and retention of moisture by fallow fields needs no illustrating amongst South Australian farmers, as the theory is amply borne out in the experience of most of us. As to how much moisture is thus saved we are unable to say, but careful experiments have shown that if the fallow be well worked the amount of moisture in the land at the end of summer will be just about double the quantity contained in soil that has been allowed to lie untouched. From the teamsters' point of view the great advantage of good fallowing is that it provides a large area of well-tilled land, free from weeds, and rich in available food, ready for the drills at a moment's notice. In this way a farmer is given a chance of benefiting by favorable opportunities for early seeding, and the work falls less heavily on the horses. This is a matter of the utmost importance in a country where the seeding season is so limited, and especially on the margin of cultivation where it is found necessary to sow dry to get the best results. If the farmers in these dry areas had to plough

their cropping paddocks in the autumn or summer it would be very heavy work, the seed bed could hardly be got down fine enough, and the horses' shoulders would suffer badly. In addition, the crops would necessarily be later sown, which is a disadvantage; and, again, the areas sown would have to be greatly reduced. This great practical advantage is felt even as far south as Kybybolite, for, although it is anticipated that in years to come, when better drainage has been secured and the soil has acquired a mellow and more friable character, that the land will be too valuable to make a bare-fallowing system economical, yet, at the present stage of development, the farmers are finding that the crops sown on the fallow are the best. The effect of bacterial action and atmospheric agencies has already been referred to, and it remains to mention that their work is greatly assisted by the fallowing process as also is the destruction of weeds.

"An experiment conducted by M. G. Paturel, at the College of Agriculture, Tunis, is summarised in the appended table.

TABLE IV.
EFFECT OF TILLAGE IN CONSERVING MOISTURE.

Date.	Percentage of Moisture in	
	Bare Fallow.	Untilled Land.
September 12	6.7	5.8
October 21	7.2	5.8
November 9	7.3	6.3
December 5	15.4	13.9
January 16	14.8	14.3
February 20.....	13.3	13.1
March 13	13.8	11.5
April 3	13.8	10.7
May 3	13.8	10.7
May 22	12.7	8.7
June 14	12.8	7.2
July 16.....	12.6	6.6

CROPPING SYSTEMS.

"We now come to consider the autumn operations connected with seeding. With bare fallows there is practically nothing more to be done, unless it be to scarify again after first autumn rains to destroy the last crop of weeds and to stir any clay patches that may have set hard since the previous scarifying.

"If the land has just carried a summer fallow crop such as maize, sorghum, or millet, the winter and spring working will have been the same as for fallow. In the spring the crop was sown, and later on fed down or soiled. During the summer the crop may have been horsehoed, but more likely not.

"As a preparation for wheat they are not good, particularly if grown without horse-hoeing and then carted off the field, as a heavy loss of moisture through evaporation and transpiration is sustained. Again, they occupy the land rather too long, and often leave it too hard to allow of easy preparation of a suitable seed bed. Such areas are, therefore, often the last sown blocks; but no time should be lost in opening the soil up, as every drop of rain requires to be caught in order to facilitate preparation of seed bed and also for the benefit of the crop.

"Sometimes when horse-hoeing has been omitted the land sets so hard that a multi-furrow skim plough or paring plough may be required; or if the stubble be heavy, even an ordinary three-furrow or disc plough may be needed. A good rolling will then consolidate the soil, and harrowing will collect the stubble for burning. Sometimes a chisel-tined cultivator, disc cultivator, or even an ordinary scarifier run across the rows will give enough tilth to harrow down into a seed bed. This work will be done immediately after first rains, provided the stock are out of the paddock. Except where temporary divisions are erected, the field has to lie till the whole crop is finished, and so much time is lost. If unable to work up the seed bed after the first autumn rains it is better to let it lie till a crop of weeds has started, and these can then be ploughed or scarified in and the land then harrowed, rolled, or rolled and harrowed ready for drilling.

"In the South-East where such fallow crops as rape and mangels are grown the loss of moisture is of much less consequence, and when inter-tillage is well performed these crops leave the land in good condition for autumn seeding. All that is required is a light ploughing so as to avoid deep burial of the animal droppings, and then sufficient discing and harrowing to make a suitable seed bed.

"Winter fallow crops such as rape, kale, and mustard, viewed as preparatory crops for autumn sown cereals, are better than summer fallow crops, in that they are generally fed down early in the spring, and so lead to less loss of moisture and nitrates. They also allow time for preparation of seed bed; but since they are not generally horsehoed they leave the soil far from clean. Such crops are best sown on stubble land, the seed being lightly buried by scarifier and harrows. As soon as the stock are out of the paddock the land should be skim ploughed or cultivated with chisel-tined scarifier, and rolled and harrowed down to a fine tilth to hasten germination of weeds and conserve the moisture, and then treated as a bare fallow. In this system no chance arises for killing weeds that would be germinated by the early autumn rains. When they can be got in early enough (and they should never be sown later than April, as they require to make good growth before cold weather comes) the more quickly growing crops as mustard and rape can be sown in March on fallowed land and they will then be ready for feeding-off in time for June sowing. In this case the cultivator and harrows

will generally be sufficient, but if a skim plough is necessary the roller should also be made use of.

"Some winter crops such as pease and beans are true 'fallow crops,' in the sense that they can be regularly horsehoed and hence 'fallowed' between the rows. Such crops are usually sown about June on the earliest of the season's fallow fields. It may be that land is specially prepared by being ploughed after the first rains and then twice scarified and harrowed down fine, opportunity being taken to destroy two and possibly three crops of weeds. This is a great advantage, as pease prefer a stale furrow; and, again, they always foul the land badly so that the cleaner we have the seed bed the better. Some would even advocate sowing pease on a clean piece of fallow and then taking two white straw crops in succession; but whilst this plan might work well enough in the moister districts it is hardly so suitable in the North. Being a leguminous crop, pease would, no doubt, leave the soil rich enough in nitrogen to support two successive cereal crops; but the soil moisture is of equal if not greater importance, and in this respect the above system would fail in districts of low rainfall. After the pease are harvested the land should be lightly cultivated; but it is better not to plough it dry as it turns up too cloddy and is then difficult to work down to a firm seed bed. If unable to cultivate or skim plough it in the summer it can be ploughed shallow after the first autumn rains, and a good germination of weeds will be destroyed at the same time. It should then be worked down and firmed with a roller before being drilled. When well horsehoed these crops form a good preparation for cereals.

"Potatoes also leave a good seed bed, because the land is well worked, generally richly manured, kept clean by horse-hoeing, and, finally, the forking and lifting of the tubers in the autumn leaves the soil in first-class order for sowing. The land is either lightly ploughed or else the potato 'shaws' are raked off, the land scarified, and then drilled. This is a very favorite rotation in the potato-growing districts of the State.

"One of the least satisfactory systems of all is the sowing of cereals after autumn ploughing, whether it be of last year's stubble, previous year's stubble, or old grass. Sufficient time is not given for the securing of a suitable seed bed, i.e., one which is loose on the top and firm below; and in light sandy soils, where this difficulty is not so serious, the reserve of moisture will not be sufficient. Again, the soil does not contain enough soluble food to promote strong growth before the cold weather comes. More serious than these matters, however, is the want of opportunity to clean the land. Crops sown on autumn ploughed land are generally very dirty and are in danger of being choked out by weeds.

"In the Far North this practice is admissible when the previous year's crop has amounted to a failure. The land is either scarified and harrowed down, or else lightly ploughed, broadcasted on the furrow, and then harrowed to cover the seed.

TIME OF SOWING.

" Taking the State as a whole the seeding season may be said to extend from the end of summer to the early part of spring. On the northern boundary of the wheat-growing area it is the usual practice to commence sowing early in February in anticipation of rain, for the very good reason that the winter is so short and the climate so dry that it is of the utmost importance to take advantage of all the rains that fall. The various objections that may be raised to very early sowing in other districts may be dismissed as insignificant whenever they conflict with operations directed towards the conservation of soil moisture in dry climates. There is little likelihood of the grain 'malting' in the ground, and the tendency to 'takeall' may be met by the free use of the roller after the crop is up. Probably the greatest risk that farmers in the Upper North run by sowing dry in February or March is that the first rains may be scarcely heavy enough to properly sprout the seed and bring it well through, and then if the second showers are delayed the young shoots may dry up and die. That severe taskmaster—experience—however, has shown that the danger is one that it will pay to face, for, on the other hand, if sowing be delayed too long the blazing heat of the summer checks the growth before the crop has reached maturity, and the small amount of grain yielded by these blighted, drought-stricken crops is generally too shrivelled and lean to be saleable at profitable rates. In these dry districts, then, it is seen that the best practice is to sow early varieties in a dry seed bed not later than February or March.

" In the Middle and Lower North districts it is generally conceded that the most favorable time is from the middle of April to the middle of May, care being taken to sow the late wheats first and follow them with the medium early varieties and then the early types. But in this connection the vagaries of the seasons must be considered. Should the season open early—say at the end of March—it will be well to proceed with the sowing of the late varieties and hay and ensilage crops straight away, and the quicker growing kinds can be held back till the season is more advanced. On the other hand, given a late season, good yields may be obtained from early varieties sown as late as the end of June, provided the spring is mild and does not set in too rapidly. With regard to barley, it is well known that malting barley cannot be grown satisfactorily in the North, as it ripens too fast. The grain is too thick in the skin and dark in the color to suit the brewers' tastes, and, furthermore, it is apt to be brittle and break when threshed, a serious defect in a malting sample. Cape barley, however, is very generally grown for green forage and pig feed, and of all the cereals it is found to be the least particular as to time of seeding. Being a rapid grower it is generally sown after the early wheats are in, but it is questionable if it would not pay—especially on the lighter and drier classes of soil—to sow it early, even if it has to be fed down during the winter. If sown too late, and a short winter be followed by a

relatively dry and warm spring, it is found to suffer considerably. Being a clothed seed it could be sown early without much danger of malting, and as it is generally placed on light land it would be an exceptional season that would prevent it being fed down should it become over 'proud.' In this way additional sheep feed could be obtained; and if the stock were not turned on to it too late or left too long the crop would be benefited rather than injured by the compacting of the land and the strengthening of the root system. Again, if sown too late it is apt to suffer from frost.

"Unlike barley the oat plant is very fastidious as to the time of sowing, and, consequently, is shown much consideration in this respect. Years ago attempts were made at the college to raise crops of Algerian and Tartar oats from June sowings, but they were rarely more than 12in. to 18in. high, and not worth the cutting. This was in no way due to faulty preparation of the land, as clean, well-worked fallows were used and every care taken to encourage a good growth. The mistake was in sowing late instead of early. An old student—Mr. A. M. Dawkins, of Gawler River—first drew attention to the matter, and, acting on his advice, April sowing was tried with much success. In our district we cannot expect to grow such heavy crops of hay as are cut in the South and South-East; but if the land is in good order and the seed be sown early enough heavy yields of grain can be obtained readily enough. The oat favors a humid climate and requires a long growing period, hence it responds to early sowing. Like barley it can safely be sown in soil moist enough to 'malt' wheat, and therefore lends itself to dry seeding. In abnormal seasons this is a distinct advantage, as they can be sown dry at the end of March or beginning of April, and so leave the teams and implements available for wheat seeding immediately after the first serviceable autumn rains appear.

EARLY VERSUS LATE SEEDING.

"This subject has been widely and freely discussed for many years, and very diverse are the opinions still held regarding it. A prominent and successful farmer in this State has assured me that he always sets his drill going on the 15th April, irrespective of season, and he finds it pays him to do so. This man speaks from an experience of over 25 years practical work on a Lower North farm.

"Professor Lowrie used to say, with regard to the college farm, that in early seasons he would sow after the first favorable rains occurring in April, and in the case of a dry autumn would rather wait till the third week in May than sow dry. Others again consider it always worth while to sow a block in March if the rainy season opens in time. On one point, and one only, almost all seem to be unanimous, and that is that no seed should be sown as late as July, and preferably not after the middle of June.

"We know from past experience that July sown wheat will turn out all right if it be fortunate enough to be blessed with a mild winter or a cold, moist,

protracted spring ; but to rely on such a combination of fortuitous circumstances is too risky a venture, even for such an inveterate speculator as the man on the land.

“ Apart from the various arguments pro and con which we will consider below, we have to recognise that on all farms of good size the crops will always be divisible into early, mid-season, and late groups. No matter whether the season be early or late this must be so, as every good farmer arranges to have a proportion of early, medium early, and late types of seed, and even in ideal seeding seasons, if such there be, oats and late varieties will almost invariably precede the more rapidly maturing varieties. If the season be unduly late the earlier types will naturally be increased, whilst the later varieties will probably be more largely used when the season opens in good time. I do not wish to convey the meaning that late wheats should displace early varieties when the season is favorable, for that is not so. If it were known that good sowing weather would continue through April and May it would, I think, be better policy to have the greater part of the land sown to early varieties, for the reason that they withstand the effects of hot, dry, spring and early summer weather better, are less likely to be caught by blighting winds, ripen their grain better under unfavorable conditions, and are more likely to escape the rust than the slowly maturing later varieties. It is just here where the judgment or skill of the farmer comes in. If he sows large areas of early varieties, say, in the end of April or first week of May, and good growing weather lasts well into the winter, the crop may become winter proud and suffer severely from frosts. On the other hand, if he decides to rely mainly on the later kinds in order to avoid this danger, he runs the risk of seeing his crop blight off through the advent of hot, dry, and very likely boisterous weather in September and October. Such questions as these can only be decided satisfactorily by the man on the spot, as the character of the land, district, previous treatment of field, kind of tilth, freedom from weeds, and other questions of similar character would need to be borne in mind.

“ The chief advantages of early sowing are—

- “ 1. You get the full benefit of all the rains that fall, and the young plants thus get their toes well into the ground before the cold weather comes.
- “ 2. There is a saving of seed, and the plants have more chance of tillering well.
- “ 3. Early crops outstrip weeds more readily, especially thickly-sown hay and ensilage crops.
- “ 4. Early sown crops make stronger growth and withstand water-logging and frosts better, especially if fed down with sheep.

- " 5. By starting early the work is distributed over a longer period, and thus falls lighter on the horses. More time is available throughout the seeding season and the work is performed so much the more thoroughly and efficiently. The lifting of the fallows can be started earlier.
- " 6. Some useful grazing in May and June may be secured if crops get too rank; indeed, where sheep are kept it is wise to sow a fair proportion of the crop early with this purpose in view.
- " 7. Early crops are more likely to escape rust.
- " 8. The hay harvest comes earlier and the crops are more likely to escape the fierce, hot, summer winds. The hay-stubbles produce earlier feed, and by easing the pressure at harvest-time there is more chance of being able to keep the fallows in good order.

" Against these it may be urged that if seeding be held up till May there will be less likelihood of faulty germination or malting of seed, and all grain can be pickled before seeding without danger. There is a better chance of cleaning the fallows; an important consideration when they have been neglected, or if the winter has been dry and the surface has been resown by stock and summer dust storms. Again, there is less risk of the crops becoming winter-proud and suffering from frosts, and 'takeall' is less likely to appear in them.

" After weighing up the arguments, however, I think the balance of evidence is in favor of early seeding in South Australia; and those of us who have experienced what it means to be at one's wits' ends to get round the work in time to start fallowing at the right season will recognise the importance of having our land ready before the rains come.

SOWING SYSTEMS.

" A number of differing methods are employed for transferring the seed to the soil and effectively covering it. In many of the newly settled districts I am informed that the grain is sometimes cast or drilled on the ashes after a good burn.

" Practically speaking, however, we may say that only two methods of grain-sowing are in use in South Australia, viz., drilling and broadcasting. Owing to the awakening of farmers to the good qualities of superphosphate, coupled with their desire to simplify the field work as far as possible, the drills that sow seed and manure through the same hoes have largely superseded the old broadcaster in the spring cart, and there is no doubt that the change has resulted in bigger returns per acre; but the question that arises is how much of this increase is attributable to the superphosphate and how much to the

method of drilling. In fine, given two similar and equally satisfactory seed beds, in one of which the manure has been drilled or broadcasted through the drill and then broadcasted with seed after favorable April rains, and in the other the seed and manure drilled in the usual way through the same coulter in the early part of June, how much difference would there be in the yields, and how much would it amount to if the trial were extended over 10 or 15 years. We have all seen sufficient field trials to convince us that the drilled crop benefits by having the soluble plant food placed alongside it in the form of little 'pockets' of superphosphate, and we know that this proximity of grain and fertiliser favors a rapid, even, and vigorous germination. I am not, therefore, going to argue that broadcasting is better or even as good a method of seeding as drilling. On the contrary, it must be recognised that by drilling we save in seedwheat to the extent of one-quarter to one-third, and this is a matter of some importance since the more expensive selections have been made available. Again, the germination is more regular in drilled fields, because the seed is sown at an even depth, whereas in broadcasted crops some is always too deep and some too near the surface. The depth of seeding can be regulated with the drill to suit different seasons and different conditions of soil and tilth, and there is a freer circulation of air through the crop. Over and above all these there is the accomplishing of the whole of the work in one turn of the land. The point I want to make clear, however, is this, that whilst the drill, when employed under favorable conditions, is undoubtedly a superior implement to the mechanical broadcaster, yet, when tested under such conditions as I have already intimated, I am inclined to think that the older method would come out on top. Even if I were wrong in this belief I feel very confident that any advantage in yield that might be gained by late drilling over early broadcasting would be too slight to be respected in the light of the many other practical advantages gained by the use of the broadcaster. To many this statement will appear heterodoxical; but whether that be so or no it has sound, solid reasoning behind it, and is borne out by practice at the college and in the surrounding district. Let me make myself perfectly clear. Whenever the season is so favorable that ample opportunity is given for getting the crop sown in good time through the drill let the broadcaster remain in the shed. The combination of chance circumstances needed to bring out this condition is, however, rarely met with, and wherever a large acreage is to be handled and the first rains are delayed the farmer is confronted with a threefold choice. He may fix his hopes on a late summer and moist spring and go on drilling till end of June or even first week of July, or he may drill the seed and manure before the seeding rains and run the risk of grain malting, or he may prepare himself for such an emergency by drilling in his manure as soon as the seed bed is ready after harvest, and so be prepared to broadcast at the rate of 60 acres to 80 acres a day as soon as decent rains arrive, or if the season be abnormally

dry he may even broadcast seed in anticipation of rain. The latter system is undoubtedly the wisest one, for even if the season be favorable the seed can still be drilled to secure the advantages of that method; and, although this will involve a second turn over the land, the work can be carried out in a more orderly and careful fashion, and the extra expense would be covered by an increase of half a bushel per acre. Where the scarifier is fitted with a manure-box so that the fertiliser can be scarified in at the first working of the land after harvest practically no additional expense is incurred, for the extra cost of the scarifying would be met by the reduced cost of drilling.

"So far as I can see, at least two points will crop up in the cautious minds of practical men who have not previously given thought to this system. In the first place they will consider such early sowing of water-soluble plant food decidedly risky, and as they will have paid over £4 a ton for their superphosphates they will be wary about exposing it to any thunderstorms that may burst over the land in February or March. On the face of it this view appears to be logical, but in reality it is based on a fallacious assumption. Phosphoric acid that has been treated with acid to make it 'water soluble,' or as we term it, 'soluble phosphate,' is not leached out of the land by rain, soakage water, or storm waters; indeed, so far as this supposed 'risk' is concerned, the manure could have been safely applied when the fallow was first worked down, either in the autumn or early spring, without the least fear. A statement such as this requires to be substantiated, and I will adduce the following facts as evidence in support:—

"1. After a portion of the Broadbalk field at Rothamsted, England, had been dressed continuously with $3\frac{1}{2}$ cwts. of high-grade super. for 50 years Dyer analysed the surface soil to a depth of 9in. and found that it had become enormously rich in phosphoric acid soluble in 1 per cent. solution of citric acid, whereas the subsoil had practically gained none. The drainage waters showed only the merest traces of phosphoric acid, so that losses by washing are negligible. This shows that the soluble phosphoric acid must be very rapidly precipitated, and that even in a district with a rainfall of over 27in. the waters flowing through a soil heavily charged with phosphoric acid were unable to remove it, even to the lower layers or subsoil.

"2. Still more convincing are the results obtained by Dyer from successive extractions of phosphoric acid with a 1 per cent. citric acid solution. He worked on two of the Rothamsted fields and found that five successive extractions brought him to a constant figure that indicated that all the residues of the phosphoric acid recently added had been removed and only the original phosphatic material remained. The total amounts of phosphoric acid thus extracted approximately equals the surplus phosphoric acid supplied as superphosphate.

TABLE V.

ROTHAMSTED SOILS—RAINFALL, 27.25 INCHES

Quantity of phosphoric acid in manure compared with that removed in crop, plus the amounts left in soil as a surplus. Tests made after 50 years' continuous manuring.

Plot.	Phosphoric Acid—Pounds per acre.			
	Supplied in Manure.	Removed in Crop.	Surplus in Soil.	Dissolved by 1% Citric Acid (5 extractions).
Broadbalk (Wheat)—Plot 5	3,960	790	3,170	3,000
" 7	3,810	1,370	2,440	2,470
" 8	3,810	1,520	2,290	2,055
Totals	11,580	3,680	7,900	7,525
Hoos (Barley)—Plot 2	3,390	1,200	2,190	2,315
" 4	3,390	1,240	2,150	2,000
Totals	6,780	2,440	4,340	4,315

Thus in 50 years we have an apparent leakage of 375lbs over 3 acres, or 125lbs over 1 acre. This amounts to 2.5lbs. P_2O_5 per acre per annum. Again, in the Hoos field it is even lower; thus we have lost 25lbs. over 3 acres in 50 years, or $\frac{1}{3}$ lb. per acre per annum—or less than 1lb. of superphosphate per acre.

"As Hall remarks, these figures clearly show that 'soluble phosphate' remains in surface soil in a form readily soluble in dilute acids such as occur in soils. It is important that there be sufficient carbonate of lime present, as otherwise insoluble phosphates of iron and alumina would be formed instead of phosphate of lime.

"3. The third 'proof' is the Roseworthy College farm, which has now been heavily manured for about a quarter of a century. From 180lbs. to $2\frac{1}{2}$ cwts. of 36 per cent. to 38 per cent. superphosphate has been continuously used at seeding time, and the accumulated phosphatic residues are undoubtedly the explanation of the improved 'condition' or 'fertility' of the soil as seen to-day. Those who knew the farm years ago will agree with me that the soils were never in such heart as they are to-day; and the number of live stock that are kept on the place speaks eloquently of the advantage of increasing the annual manurial dressing beyond what is required to grow the maximum crop of wheat or other cereal.

"It is evident, I think, from what has been said that—provided there be sufficient carbonate of lime in the soil, and the absence of this compound is not a common defect in our soils—there can be no objection to sowing superphosphate at any time of the year that suits our system of farming.

"The second objection that may be raised is that the system involves the separation of the fertiliser from the grain. As mentioned before, this I consider the only valid objection, and if it were possible to secure closer contact when seed is broadcasted it would be so much the better for broadcasting; but still I do not consider that we lose so much by placing the seed

and manure a bit further apart as we do by deferring drilling till it becomes necessary to continue sowing right into the winter. To get the seed in just at the right time of the year, when the land is in nice working condition, is to my mind of more importance than the placing of seed and manure in actual contact. It should be mentioned, also, that under the broadcasting system we get a more even distribution of plants over the land, and the average plant is healthier and more evenly developed than when they are crowded side by side in rows or drills. At the college farm this year I took the precaution to get 125 acres sown with manure and partly also with seed before the May rains, yet we did not complete the seeding operations for the year till the end of June. Had it not been that I continued drilling manure during the latter half of March and throughout April we could never have compassed the work in the short season granted us. Those of you who journey to the college on Monday next will see for yourselves how the crops have turned out, and your attention will be drawn to a broadcasted hay and silage crop that was preceded by a heavy summer growth of maize and sorghum. This field is light in character and rather stony in parts. It was scarified, harrowed, and in part drilled with superphosphate early in April, and the seed broadcasted in anticipation of rain at the beginning of May. Other paddocks were similarly treated, and we found it to be an almost inestimable advantage to proceed with work after a good rain at the rate of 50 acres to 60 acres a day, and I see no reason why a portion of the land it is proposed to crop could not be prepared in this way each year. This could be used for the hay crop, and sufficient time would be gained to make one largely independent of seasonal peculiarities, or as much so as seems possible at present."

THE DISCUSSION.

Mr. Coleman—"You said something about the loss of soluble nitrogen from bare fallow. Is it not a fact that the soluble nitrogen is increased by bare fallow? And then is it not true also that the soluble phosphates revert in the soil? Did this not account for the fact that the phosphoric acid was not lost by drainage?"

Mr. Colebatch—"What I said was that you laid yourself open to loss of soluble nitrogen through washing. It is true that during spring and autumn the bacteria rendered the nitrogen soluble, and if rain fell this would to a certain extent be washed into the lower layers. In regard to the other point the super. did revert to the citrate-soluble form, and this was why it was not washed out of the soil. This phosphate was still available to the plants. Wherever there was lime in the soil there was no risk of any real loss of phosphate."

Mr. Dawkins—"What extra yield do you get in wheat by deep ploughing?"

Mr. Colebatch—"The deeper you can get the surface soil worked up, the more food room for the plants and the greater amount of crop you can grow."

You have a greater storage area for the water. By increasing this storage area, the bigger the crops. Bigger crops, bigger stubble. The more stubble you have the more you are increasing the organic matter, and thereby increasing the moisture storage capacity of the soil."

Mr. Sassanowsky (Mount Gambier)—"Is it necessary for cereals to plough at a depth of about 7in. or 5in. down to 4in.?"

Mr. Colebatch—"It would be a mistake to plough anything like that deep before planting cereals. After potatoes the land is already fairly open, and it should not be stirred up again vigorously. I prefer not to speak of Mount Gambier at present."

Mr. Dawkins—"Have you any figures about broadcasting and drilling?"

Mr. Colebatch—"I could get them, but offhand I cannot quote you any definite figures."

The Hon. T. Pascoe, M.L.C.—"Does Mr. Colebatch consider it safe to plough 6in. or 7in. in the spring in the drier districts if the Campbell subpacker is used afterwards?"

Mr. Colebatch—"Wherever there is a light rainfall it is of the utmost importance that the soil should be well packed. If you are going to plough to 6in. or 7in. I do not know any implement that will pack. As general advice I should say plough as deep as the packer will work satisfactorily."

A Delegate—"How would you deal with stinkwort?"

Mr. Colebatch—"It is better to cut off as much as you can and burn it. It is organic matter that takes time to decay."

Mr. Dawkins—"I move a hearty vote of thanks to Mr. Colebatch for his able address."

Mr. Coleman—"I second that."

The motion was carried by acclamation, and the meeting closed.

(To be continued.)



HERD OF WHITE CATTLE.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Oct.	Nov.			Oct.	Nov.
Amyton	*	—	—	Meadows	*	—	—
Angaston	*	15	12	Meningie	*	15	19
Appila-Yarrowie	*	—	—	Merghiny	315	6	3
Arden Vale & Wyacca ..	*	—	—	Millicent	*	11	8
Arthurton	*	—	—	Miltalie	*	15	12
Balaklava	311	8	—	Minlaton	*	22	19
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Crystal Brook	309	—	—	Parrakie	*	1	5
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Mannum	*	29	26				

* No report received during the month of September.

† Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Craddock, August 27.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. Patterson (chair), Gillick, Neylon, Sullivan, Finch, Jago, Hilder, Lindo, Smythe, Riordan, McAuley (Hon. Sec.), and one visitor.

LOSS OF MARES WHEN FOALING.—The Chairman reported that he had found four years of age a dangerous time for mares to foal. Mr. Riordan knew an owner who lost four mares, which foaled at this age, in one season. Considerable discussion took place in which opinions were exchanged regarding treatment of animals at the time of parturition.

Orroroo, August 26.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Robertson (chair), Roberts, Brook, Chapman, Haynes, W. W. and C. E. Collins, Copley, and Tapscott (Hon. Sec.).

POLAND-CHINA PIGS WANTED.—The Hon. Secretary wished to know from whom Poland-China pigs could be purchased. [Can any reader let us know?—Ed.]

ANNUAL REPORT.—The Hon. Secretary presented his report which showed that only three meetings had been held with an average attendance of six. The membership was now 11, and with the new activities brought about by the settlement of local irrigation lands brighter days for the Branch were anticipated.

THIRTEEN YEARS HON. SECRETARY.—The Hon. Secretary, who had held office for 13 years, at the special request of members, agreed to act for a further 12 months.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Crystal Brook, August 29.

(Average annual rainfall, 15 in.)

PRESENT.—Messrs. Billingham (chair), R. and M. P. Pavy, Burton, Shaw, Hutchison, H. V. and G. Sargent, Morrish, Mill, Tozer, Sutcliffe, Lovelock, Robinson, Venning, Clark, B. and M. Weston (Hon. Sec.), and one visitor.

HORSES—BREEDING AND JUDGING.—A paper on this subject, to the following effect, was read by Mr. Venning:—"To improve the breed of the horse the breeder must study the points most desired in both sire and dam of the class he intends to raise. To get good stock you must use a mare in her prime, and take care of her when in foal and while suckling her offspring. She should be well fed, and not put where she cannot satisfy herself after picking all day. A sire that is popular is nearly always overworked, and from him you will not get the stock you expect. Sires and dams should be chosen because of their stamina, and the proportion of their make, their thews, muscles, and general soundness. Breeding from animals when in an exhausted condition is the cause of many complaints. Let the most promising female foal be destined from its birth for breeding purposes. It should never be placed in the hands of a rough breaker, or have its back strained by being mounted. Let it be rather coaxed to toil than coerced to labor. It

is astonishing how much more can be accomplished by such means than will be effected by harsher methods. After its fourth year the mare may earn its keep, but should never be urged beyond that point. In this manner the first six years should be passed, when the mare, being matured sufficiently and uninjured by work, may be put to the destined purpose. In the selection of a sire allow one to mend the faults of the other, but avoid absolute contrast. When choosing a mare for breeding let compactness of form—not the big-bodied, roomy mares, as they are termed, with small hind quarters, but strength and aptitude for exertion decide the choice. The legs should be stout and short, declaring bone and tendon to be present, and in the draught the upper portion of these members cannot be too bulging, thick, long, or muscular. The crest should be highly arched, and characterised by substance, for the movements of the body are much controlled by the muscles of the neck. The shoulder cannot be too fleshy, so it shall slant properly, and firm to the touch; withers sufficiently lofty. For hunting or for ordinary purposes high withers are imperative. The loins ought to be broad. The hips cannot appear too strong, or be too wide apart, whilst the quarters must seem large in every direction. Nor is it to be considered a fault should these parts stand higher than and appear disproportioned to the other regions. Above all see that the channel is wide, the mouth large, and the nostrils ample." He then gave the measurements of the different parts said to form a perfectly proportioned horse, and expressed the opinion that agricultural societies should agree to some method of measurement so that judges should have a standard to enable them to decide some of the more important points of the animals set before them. He did not think the present system of Government examination of stallions served any good purpose, but would like to see double subsidy given to societies which awarded no prizes to horses below a certain standard of proportions. In the discussion which followed many of those present considered three years was the best age at which to commence breeding from a mare, and thought it unnecessary to wait until six years old as suggested in the paper.

Whyte-Yarcowie, September 24.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. Lock (chair), G. D. and G. R. Mudge, Mitchell, Hunt, Faulkner, Travers, Pearce, Ward, Jenkins, and Walsh (Acting Hon. Sec.).

FARM ECONOMICS.—Mr. Lock read a paper under the title of "Do we Make the Best Use of Our Holdings?" He was of opinion that if farmers worked their land better and cultivated smaller areas they would reap a larger profit; better crops would be grown, and larger areas would be left for grazing purposes. Every farmer should have a fruit and vegetable garden, to provide for the needs of the home in that direction. This would also enhance the value of the holding. He also vigorously advocated tree-planting for timber supplies. The need for this was becoming more and more acute every year. The value of farmyard manure should be realised, and all manure from stables, &c., put to good use, instead of being allowed to lie and rot, and lose the greater part of its value.

Yongala Vale, September 10.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. Battersby (chair), F. and H. Miller, D. and G. Dowd, Chigwidden, Simon, Marshall, Cooper, T. and W. Keatley, Schmidt (Hon. Sec.), and two visitors.

CO-OPERATION.—Mr. Miller read a short paper on "Co-operation," in which he pointed out the advantages to be gained by combined effort in productive and manufacturing industries. Co-operative enterprises were not such a success as they might be in South Australia because of lack of support. Co-operation would call more factories into being in this State, and produce, such as wool, would be manufactured into goods here, saving the cost of shipping both ways, and would also give employment to many hands. He quoted statistics for 1908, showing that there were 600 co-operative societies in the United States with a membership of 79,468, a share capital of £201,367, loan capital £119,417, reserve and insurance funds £45,119, and sales during the year amounting to £3,222,043. The profits during that year were £33,258. The number of persons employed was 2,267, and £93,639 was paid in wages. A long discussion followed, in which members agreed that much good could be accomplished by co-operative effort.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Balaklava, September 10.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Goldney (chair), Thomas, Anderson, Spillane, Burden, Curtis, Hoepner, and Banyer (Hon. Sec.).

ROLLING GROWING CROPS.—The Chairman introduced this subject for discussion. He thought a crop on clayey soil would benefit, if rolled at the proper time, by having the clods broken down. Probably the greatest value of rolling was with the hay crop. Making the surface of the soil smooth and level gave a lower cut than would be possible over an uneven surface, and the hay thus gained amounted to a good deal where large areas were dealt with. Rolling the land also made the work of harvesting machines easier and more effective. In his opinion crops which were rolled were less subject to takeall, and it was well known that grubs were killed if the land was rolled at the right time. Among the disadvantages connected with rolling the crop might be mentioned the fact that the opportune time for the work was just when the farmer was fallowing, and in some seasons when the plant was just at the stage to derive most benefit from the rolling the wet condition of the soil made it impracticable. Mr. Anderson agreed with the writer that rolling the crops paid in this district. In his experience, however, it was a difficult matter to find time to do rolling at the proper stage in the growth of the plant, and unless it was done at the proper period more harm than good might result. Land was now worked down to such a fine tilth that rolling did not seem so necessary as when the soils were rougher. He had noticed that crops which had been rolled stood up better than those which had not. He thought some farmers had been put against rolling by Professor Lowrie, who advocated light harrowing. Although suitable for some soils that practice was not the best for this district. Other speakers were in favor of rolling crops on light soils, but all agreed that where clayey soil was met with considerable caution was necessary.

Mallala, September 7.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. Marshman (chair), Temby, Webb, Moody, Nairn, Jarmyn, Dr. Frayne, Murphy, Nevin (Hon. Sec.), and one visitor.

GERMS AND THE FARMER.—Dr. Frayne read an interesting paper dealing with germs—using the word in a wide sense—and their relation to the farmer. He explained that myriads of micro-organisms were continually at work in the soil storing and making available plant food, and mentioned that milk was turned sour by the action of germs, and that the different flavors of butter and cheese were due to different bacteria. The frozen meat trade was made possible by the fact that germs would not flourish below a certain temperature. He then mentioned that various diseases of stock were due to germs in the blood, e.g., anthrax, tetanus, tuberculosis, &c., and explained the symptoms and progress of these complaints, as well as methods of combating them. At the conclusion of the address members expressed themselves as fully alive to the important part bacteriological research was destined to play in agriculture generally.

Watervale, September 19.

(Average annual rainfall, 27 in.)

PRESENT.—Messrs. Sobels (chair), F. and A. Burgess, Barker, Dunstan, Solly, Ward, Parker, Scovell, Davis, S. Sobels, Hamp, and Duke (Hon. Sec.).

MISCELLANEOUS ITEMS.—Discussion took place on the matter of breeding sheep dogs. It was suggested that a cross between a Scotch and a Kelpie collie would produce a suitable animal. Speaking of the cattle seen at the show, the Chairman considered the Guernsey best for this district. He also fancied the milking Shorthorn breed. Considerable discussion ensued, in which the majority favored the Ayrshire.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Maitland, September 3.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. Opie (chair), Bawden, Hasting, Hill, Jarrott, Lutz, and Pitcher (Hon. Sec.).

QUESTION BOX.—In reply to certain questions, the following opinions were expressed:—

Harvesting.—The complete harvester is preferable to the stripper in that all the work is done in one operation. Some drawbacks with the harvester, however, are these:—It is necessary to wait till the crop is perfectly ripe before commencing, whereas the stripper can be used two or three days earlier. A fairly intelligent and observant man is needed to work the harvester. Heavy rain will do more harm to exposed bags of wheat than to a heap of stripped wheat. It does not pay to work the harvester when the weather is very damp, as there is more waste than with the stripper under similar conditions. The stripper carries everything to the heap, and waste stuff can be used for live stock, but the harvester leaves all unthrashed wheat on the field. Harvesters have more parts to keep oiled and in order, but as against that there are no heaps to throw up as with the stripper. Four harvesters will cost about £20 more than four strippers and a motor winnower, but for the last named extra labor is necessary and petrol is required. Harvesters each need one more horse than strippers. One member considered the stripper best for rough, stony land, while another thought harvesters stood better than strippers on rough land. The majority of those present preferred the complete harvester.

Influenza in Horses.—First symptoms in working horses are decided rise of temperature, animal is dull and apparently lazy. Goes off his feed and soon shows discharge from nostrils, becoming thicker as time goes on. Sweats profusely, loses flesh very suddenly, and as disease advances develops a harsh cough. If worked at this stage breathing is very heavy and can be heard a long way off. If the limbs swell it is a very serious case.

Government Examination of Stallions.—That the examination of stallions required by the Government at subsidised shows was a correct move. It afforded protection to buyers. A number of stallions of doubtful soundness were brought from other States, and South Australia was made the dumping ground for animals which could not pass the standard elsewhere. All stallions permitted to travel for hire should be compelled to pass an examination as to hereditary soundness. The Branch resolved that in its opinion legislation should be passed to bring this about.

Moonta, September 23.

(Average annual rainfall, 15 in.)

PRESENT.—Messrs. Ortloff (chair), Atkinson, Lawry, Nankivell, Luke, F. and H. Nankivell, Cooper, and Laidlaw (Hon. Sec.).

WHEAT AT MARCH SHOW.—The following suggestions were agreed to, as being likely to increase the number of entries in the wheat competition at the Adelaide Show, viz:—
“Make the quantities of exhibits 6bush. in classes 2 and 3 and 9bush. in classes 1 and 4. Double the prize money, as the expense of showing is considerable, and also award medals.”

Paskeville, August 20.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Price (chair), Goodall, Rundle, Wehr, Bussenschutt, Forbes, Pontifex (Acting Sec.), and one visitor.

BUREAU WORK.—The following paper, dealing with this subject, was read by Mr. Goodall:—“In the *Journal of Agriculture* I have noticed a number of papers on ‘Bureau Work.’ They all refer to a lack of interest taken by the members in the meetings. We have not to go far from home to find this. In this Branch, for instance, the meetings seem to have drifted into a conversational form. My object in writing this paper is to start the ball rolling, and try to induce members to take more interest in bureau work. When our Branch was formed we had very interesting meetings. We could take part in conferences, we held socials, &c., but the meetings of late years seem to be very stale,

and very little interest is taken in them. Our Branch consists of 11 members, and only seven of that number are farmers. This proves how little interest is taken in the Bureau by the farmers of this district. Living as we do in one of the very best wheat-growing districts of the State, the farmers should take more interest in our meetings. If they do not wish to become members, they could attend the meetings and help to make them more interesting. One of our old members resigned because he knew more about farming than the Bureau could teach him. Now, this is the very sort of man we want. [With his knowledge but with a less selfish spirit.—Ed.] Some men are not willing to impart to others the knowledge they possess. These are useless to the Bureau. It has been remarked that all the subjects one can think of have been freely discussed by Branches at different times. Granted that this is so, there is still room to write on the same subjects and to add to or criticise the information available. No matter how short the paper, or what the subject may be, if it leads to discussion good may result. Some Branches have installed a question-box, which I think is a good idea. Any person has the privilege of putting a question in the box, and at the next meeting of the Branch the members present answer them. If deemed necessary they are forwarded to the Advisory Board of Agriculture, which obtains expert advice, and the answer is published in the *Journal*. The *Journal* is a most valuable paper. It contains a vast amount of most useful information, especially to the man on the land; it is worth 10 times the amount that the Government ask for it. I would advise all farmers, especially young men going on new land, to subscribe to the *Journal*; they will find it money well spent. I trust my remarks may be the means of starting fresh interest in our Branch, and would say to fellow-members—'Be punctual at meetings, come prepared with something to say, and try to make the meetings more interesting.'

EXPORT OF LAMBS.—Considerable discussion took place on the lamb export trade. The Chairman and others expressed themselves satisfied with their exporting ventures. It was a distinct advantage to be able to send lambs by rail when the traffic was not so congested as it was immediately preceding the Adelaide market days.

Pine Forest, August 16.

(Average annual rainfall. 13in.)

PRESENT.—Messes. Edwards (chair), Carman, Adams, Schultz, Nelson, Inkster, Barr (Hon. Sec.).

HORSE COMPLAINTS.—Mr. Carman read a paper dealing with complaints of horses, and prescribed certain remedies for various complaints. Considerable discussion followed, and the need for a duly qualified veterinary surgeon to reside in the district was emphasized.

SEARING LAMBS.—Mr. Nelson was of opinion that searing lambs' tails was a much better practice than cutting. The older method resulted in loss of blood, and checked the growth of the lambs; occasionally they bled to death. He exhibited a home-made appliance for searing. Members agreed that searing was preferable to cutting.

WESTERN DISTRICT.

Elbow Hill, September 24.

PRESENT.—Messes. Cooper (chair), J. B., E. R., and S. V. Wake, G. C. and H. Dunn, Chilman, Bunn, T. J. and J. Tilley, Rehn, Harvey, H. W. and L. Wheeler, Kernic, G. F. Wake (Hon. Sec.), and seven visitors.

FARMING ON A SMALL CAPITAL.—Mr. Dall's paper read at Congress was read and discussed. Mr. Tilley thought that grit was a man's best asset when starting out farming. When he commenced he only had a team of bullocks. Mr. G. Dunn agreed with this opinion. He regretted that he did not start farming earlier in life. He recommended those who were desirous of commencing farming to take land on shares, and thus gain experience. Other speakers agreed that given determination and perseverance a man

would undoubtedly succeed. Poultry and dairying helped very largely at the start; the proceeds of these side lines frequently assuring the household expenses.

HORSES v. SHEEP AS SURPLUS STOCK.—Mr. Rehn expressed the opinion that in this district it would pay better to breed horses than sheep as surplus stock. The former could be produced here equal to any in the State. Messrs. Cooper and Dunn agreed, but Mr. Wake preferred sheep, on account of the quicker return realised from them.

Green Patch, September 8.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. G. Sinclair (chair), Parker, J. Sinclair, Halls, Howard, Gore Merchant, Whillas, McFarlane, Smith, and P. Sinclair (Hon. Sec.).

ONION-GROWING.—An address on "Onion-growing" was given by Mr. Gore as follows:—"Suitable soil is one of the most important factors in producing fine-shaped bulbs and heavy yields. Black, sandy loam or black gullies and flats properly drained, where there is not an excess of magnesia, are the most suitable soils. Good reliable seed is of equal importance. The best way to start is to purchase from a reputable seedsman, and then select the very finest bulbs and raise your own seed from these. The principles of strain and selection apply with seed as with live stock. Prepare a small nursery bed, and sow the early varieties in March and April, and the later sorts in May. When large enough, transplant 4in. apart in rows, with 9in. between the rows, in rich, well-manured land. Bonedust and bone super. give good results. Poultry droppings also are excellent. Stable manure should be used in moderation on light soils. Onions root better if cut off half an inch above the crown. As soon as weeds appear they should be lightly hoed, and again at intervals hoeing and weeding thoroughly; the plants thus growing on without a check. When ready for pulling, which may be seen from the tops falling and drying, they can be hand-pulled and left in rows on the land for a few days. After this they should be carefully gathered and strung on wires or poles, or stored in thin layers in a rain-proof shed." Samples of onions grown by Mr. Gore were tabled. In reply to Mr. Whillas Mr. Gore said he had grown onions in a small plot at the rate of 30 tons to the acre; but the average of that crop was about 15 tons per acre. He thought the roots should be very lightly covered, and advised members not to plant too many of the early varieties, as they did not keep so well.

POTATOES.—Mr. Merchant read an interesting paper on "Potatoes," as follows:—"The potato grower will have to be very careful in the choice of soil, because on this peninsula only certain classes of soil will suit them. It does not matter much what the color of the soil is, as long as it is deep and free working, and will hold the moisture. There is a large quantity of such soil in this neighborhood. I have seen land that was well worked before planting give more than double the crop taken from soil ploughed only at planting. Therefore plough as deeply as possible and work the land thoroughly. All farmyard manure is of great value for this crop. If you have only a small quantity you will have to supplement it with either bonedust, super., or blood manure; the last for preference. The manure, of course, will be put in the planting furrow. No matter how well you prepare the soil, and how much manure you use, if the seed is inferior or diseased the crop will be a failure. Last year from good seed I had six tons per acre, while from inferior seed only half that quantity was returned. It is much safer to obtain large seed. When cut you can detect any signs of disease. Cut to about two strong eyes, and have ready a dip for the cut seed. Formalin may be used with advantage. The distance between the rows should be not less than 27in. nor more than 30in., with 12in. to 14in. between the sets. Put the sets in the side of the furrow, not in the bottom. The best depth is from 4in. to 5in. When the potatoes are just showing, the harrows should be run over them. Do not be afraid to do this, as it will not do any damage, and immediate good will result. When the rows are plainly seen the Planet Jr. should be run through them as deeply as possible, and again in about three weeks' time, when the wide foot should be used, so as to earth them up a little. One cannot go far wrong by planting Beauty of Hebron for early tubers. Redskins, Pink-eye, Carmen, and Snowflake—these may safely be recommended." In reply to questions, Mr. Merchant said potatoes would stand plenty of water if well drained, but would not do in water-logged soil. He planted from October to Christmas, in deep, black soil well worked, and had good results. Sandy soils must be planted earlier. Mr. Parker said he grew potatoes on new Yacka land, and dug tubers up to 1lb. in weight. Mr. Merchant dug 7 tons to the acre, and thought with good seed he could easily grow 10 tons. Mr.

Halls planted last year $1\frac{1}{2}$ cwt., and had a return of 17 cwt. Mr. Gore gave a demonstration of seed-cutting. He and Mr. Merchant both left two strong eyes in each set, cutting others out when necessary. Mr. Merchant expressed the opinion that potatoes should be inspected, on account of Irish blight, before being shipped to the West Coast, as the coast was free from the disease. This opinion was indorsed by the other members.

Koppio, September 15.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Price (chair), Brennand, Howard, M., G. B., and F. Gardiner, Thompson, Newell, Roberts, F. and R. Richardson (Hon. Sec.), and five visitors.

FARM MANAGEMENT.—A paper on "Farm Management" was read by Mr. F. Richardson. Good boundary fences, he said, should be one of the first considerations. He would have posts about 4in. by 4in., and 5ft. 6in. long, putting 18in. in the ground. They should be placed 18ft. apart. Strainers would be put in the ground 2ft. 6in. deep, and corner ones well strutted. If netting was used it would be necessary to have only two plain wires—one at the top of the netting and one midway between that and the top barbed wire. A trench could be made with a single-furrow plough, and the netting put in with a lap of about 3in. The best way to fix the netting to the wires was with 18-gauge galvanized tying wire. Good gates, well hung, should be put in where required, and no makeshift tolerated. Waterproof sheds should be erected for the implements and horses, and for preference he would roof with straw. The risk of fire was not great if care was exercised, and the straw kept the temperature more even, both in summer and winter. Implements and machinery should be overhauled, cleaned, and repaired, if necessary, at convenient periods. He was strongly in favor of having a motor engine on the farm. He had tried one for 18 months, and it had never failed. It was used for chaff-cutting, heading and grinding, and would run all day with very little attention. Fruit and vegetables should find a place on every farm in this district. Sheep should also form a part of the live stock, to supply the home with meat. It would pay to procure a ram from a well-known breeder, as the offspring would be better than from the local stock, and the cheque from the wool should be of considerable value. A few foals could with advantage be bred each year, and the best sire available should be employed, even if the fee was twice that charged for an inferior stallion. The mare must also be sound and vigorous if good stock was to be obtained. He would give the foal the best of chaff, oats, &c., from weaning, and keep it in condition all the time. At two and a half or three years colts might be broken in to light work, giving half a day at it at first, and gradually extending the hours of work. General discussion followed. Members thought it would be wiser to have the fence posts 12ft. rather than 18ft. apart.

FARMING IN MALLEE LAND.—Mr. Newell read a paper dealing with some of the farm work in mallee country. He thought time devoted to clearing the land under crop was well spent. Roots and stones should be carted off before the crop got too high. As soon as seeding operations were over, attention should be given to this work and to fallowing. Early fallow gave the most satisfaction, and if worked in the wet months the stumps were pulled out in greater numbers than when the soil was fairly dry. The harrows should be used immediately after ploughing up fallow, to remove all the loose stumps, and these should then be carted off to give a clear way for the cultivator. Fairly deep ploughing, say 4in. or more, was best for the new land of this district: it killed most of the weeds, and left the soil in good condition for subsequent working. For cutting shoots he preferred a sickle-shaped hook, as this did not turn in one's hand when cutting strong shoots. Shoot-cutting in the crop should be left as late as possible, so that it would be unnecessary to go over the same work twice. Hay crops should be rolled if possible immediately after seeding. Mr. Newell also thought farmers would do well to insure their crops, but with this suggestion some of the others present disagreed.

Merghiny, September 13.

PRESENT.—Messrs. Bubner (chair), Shilton, Barnett, Lynn, E. Barnett, Mulroony, Moody, Schwartz, Doyle, Doolan, Symonds (Hon. Sec.), and two visitors.

FALLOWING.—This subject was introduced for discussion by the Chairman, who regarded fallowing as a most important and necessary operation to successful cereal-growing. By this means the land was cleaned of weeds, sweetened, and fertility restored. If

properly worked moisture was conserved, and the succeeding crops benefited. He thought August was the best month in which to fallow. If the land was fallowed earlier than this, however, and weeds came up, it must be worked from time to time to kill them. He had ploughed part of his land 4in. deep, and another portion only half that depth, but at the end of the season could not notice any difference in the yield. Land on which the rubbish had been burnt yielded better crops than an adjoining piece not burned. Mr. Barnett was of opinion that the soil should be ploughed to a depth of 5in. or 6in. to thoroughly turn the weeds under. The subsoil being turned up would be sweetened by the sun and air. Mr. Mulrooney thought 4in. about the right depth to plough in this district. He had found early fallow the most satisfactory. Difference of opinion existed regarding the best width for the cut. Some thought up to 8in. or 9in. was satisfactory, but others considered 7in. quite wide enough. It was agreed that fallowing was of great value in cleaning and sweetening the soil and, if properly worked, in retaining moisture, but it was pointed out that to do good work good implements were essential, and when worn down to a certain stage shares should be replaced with new ones. It was thought that sheep would not do very well on fallow in this locality, as the wool became damaged if they were put on loose soil.

Mitchell, September 15.

PRESENT.—Messrs. D. Green (chair), Molloy, Ness, F. and R. L. Myers, Jericho, O., P., and J. Green, W. A. and H. W. Gregory, Brice, Dorward (Hon. Sec.), and four visitors.

PROTECTION OF HAYSTACKS.—Mr. P. Green introduced this subject for discussion. Hay was very scarce in this district, he said, and consequently dear to buy. If bought from other farmers the cartage over bad roads was a very serious matter. Therefore every farmer should take all sorts of care that none of the hay produced was lost for want of proper protection. In making the stack the centre should be kept well up. When it had settled down properly a layer of sheaves could be pulled out all round to obtain the desired slope. Plenty of straw should be put on top, and good thatching of fine broom bush. Better still was a covering of galvanized-iron on frames hung over the stack, with logs suspended from the lower ends of the frames. Members agreed that the centre of the stack should be kept well up to give the sheaves a good slope and run the water out. Building it with a fork, when possible, helped to get the shape and slope required. For covering some still favored thatching, while others preferred iron or malthoid. This latter material was cheap, and would last for several seasons with care. The most economical roofing for a stack was iron, either in sections of two sheets each or erected to form a permanent roof. While it was not so easy to build the stack under a roof, there was no handling of iron or thatch, and the provision would last a lifetime. A concrete floor was said to be the best on which to put a stack, and it should be well raised in the centre. Some thought stacks should be built running north and south, so that both sides were exposed to the sun during the day. Others pointed out that if built east and west the eastern end could be opened, as very little rain came from that quarter. Corners should be rounded off in the building, and the sheaves all laid across the stack to facilitate pulling down. It should be a little wider at the eaves than at the bottom to make the water run clear of the hay.

Penong, September 9.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Edwards (chair), Lovell, Stiggants, Kalmar, Roberts, Shippard and Oats (Hon. Sec.).

MIXED FARMING.—The following paper on this subject was read by Mr. Roberts:—“Seeing that the district is getting settled and the land cleared, mixed farming should be carried on more extensively than it is at present. In this way we should utilize the land to the best advantage. For instance, with 3,000 acres cleared a man could have 500 acres under crop, of which a portion should be cut for hay, and 500 acres fallowed ready for the next year. The remaining 2,000 acres would be ample on which to raise stock and keep a few sheep. A farmer should keep at least four good mares and mate them to a good horse. Do not mate all your mares with one stallion simply because he passes your door. This may occupy the least time, and he may suit one or two of the mares, but take into consideration the size, shape, &c., of each mare, and mate them accordingly as far as possible. I prefer the Clydesdale draught stallion. Breeding in this way a

farmer may have two or three good colts to sell every year, which, at the present prices, will mean a very substantial addition to his income. With fair seasons I think about 300 sheep could safely be kept on the farm instanced. These are invaluable for cleaning the fallow, and so save a lot of labor. In addition we have the clip of wool and our own mutton. In this district we need to breed for the wool, as we are too far from market to send lambs or mutton. I think the Merino is the best breed, as that wool always commands the top price. It is a mistake to keep the rams too long, as if this is done both the progeny and the wool deteriorate in quality." Mr. Shipard thought everyone should keep a few sheep. In ordinary seasons it would be safe to keep one sheep to four acres, but this year one to 10 acres would be sufficient. The more sheep kept per acre, the lower the quality would be, and if too many were kept they were neither fit to eat nor sell. Mr. Lovell thought everyone should fallow, as it had been proved to produce better crops and to pay. Every farmer should keep some sheep, if only for mutton. The rams should be changed frequently. If inbred the sheep and wool would deteriorate in quality. The Chairman agreed with the preceding remarks, but emphasized the need of caution, as if sheep were overstocked the other animals on the farm would suffer. He did not favor putting light mares to heavy horses, but if draught mares were put to a blood horse active stock would be produced for light work. Mr. Stiggants thought it would pay to procure good milking cows from the other side of the gulf. Three which had been brought over were fairly satisfactory. He wished to know how much land should be cleared before keeping sheep in this district. Members thought no hard and fast rules could be laid down, but it was inadvisable to keep sheep until there was spare feed or the paddocks became dirty. Mr. Shipard said it was best to buy six-tooth sheep if required for mutton.

Petina, August 27.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Penna (chair), Boscombe, Wharf, Goodhardt, Simmons, Keeley, Newbon, and Souter (Hon. Sec.).

SCRUB-CUTTING.—A paper on this subject was read by Mr. Newbon. The scrub in this district was too heavy to roll down, and therefore it had to be cut. It was best to cut all the small titree first to make a bed of light stuff for the bigger trees to fall on. They then burned much better. A big tree should be cut on the leaning side first and small trees should be "feather cut" to facilitate the burning of the stump. With big stumps which could not be cut off level with the ground it was best to leave some inches of timber above the stump; then light a fire on the stump to kill the bark, and when burnt out put a few sticks round the stump. This would result in the stump being burnt right out when the scrub fire was made. If the burning was to be accomplished with a north wind blowing, and this was the best wind to have for the purpose, a break of half a chain was necessary on the south side. Leaves and sticks should be raked up with a horse-rake and the ground cleaned up with a disc harrow or plough so that no leaves would be left to carry the fire across. Wind breaks should be a chain or two wide and should be left on the highest ground. Members generally agreed with the views expressed in the paper.

Shannon, August 17.

PRESENT.—Messrs. W. Proctor (chair), Smith, H. and F. Proctor, Glover, G. and W. Gordon, Kain, and M. A. Cronin (Hon. Sec.).

FARM MANAGEMENT.—Mr. Cronin read a short paper, in which he emphasised the wisdom of so planning the work of the farm that the various operations should be accomplished at the most opportune time. Heavy scrub was best dealt with if rolled in August or September. The shoots then made fair growth, and burning off in February gave them a severe check. It always paid to roll scrub at the right time, so that it got well dried and a good burn was practicable. Most farmers used the plough at the beginning of the season, and then as time flew by resorted to the cultivator for the remainder of the work. If the cultivator was used at all it should be employed at the beginning of the season, and then while the crop was growing the plough could be used with advantage. A few stubble burns, given a good day and careful management, would kill all the mallee stumps.

Shannon, August 25.

PRESENT.—Messrs. Proctor (chair), J. and M. Cronin, Williams, J. and S. Carey, W. and H. Glover, Fleming, V. and G. Gordon, W. M., E. B., and L. B. Smith, M. Cronin (Acting Sec.), and five visitors.

STRIPPER v. HARVESTER.—Mr. J. Carey read a paper dealing with harvesting machinery. For use on clean land, where the farmer could cut plenty of hay and did not need cocky chaff for horsefeed, he preferred the complete harvester. Not only was the grain bagged in much less time than with the stripper and winnower, but a great deal of labor was saved, and as men were difficult to get this was an important factor. One man with six horses and a harvester could easily take off 250 acres of crop unaided. Doing this work with the ordinary stripper, however, would take about three men. With the harvester, too, the farmer could get to work fully two hours earlier than with the stripper, and could also work later at night. The harvester also reaped cleaner and did not waste so much wheat. A further great advantage was that if the weather became wet and cold and harvesting operations had to be suspended, the man who had a few loads bagged could cart it to the railway and sell it before it lost any weight. It was admittedly a difficult matter to save much cocky chaff with the harvester, but if strippers were found necessary at first, on this account, as time went by and hay was grown in sufficient quantities the harvester would be found the cheapest and best machine to use. In the discussion, Mr. Cronin was of opinion that strippers and a motor winnower were preferable to a harvester in new country where hay was scarce. Wheaten chaff was an important item. A harvester was not always satisfactory in a poor crop. Mr. Glover preferred harvesters, on the whole, as they saved labor, but he agreed that they did the best work in a fair crop. After each member had spoken a vote was taken resulting in a majority for the stripper and motor winnower.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Lameroo, August 20.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. F. W. Eime (chair), Cameron, E. J. and W. J. Trowbridge, Ross, McMahon, Leckie, Thyer, Hannan, E. R. Eime, Koch (Hon. Sec.), and one visitor.

Co-OPERATIVE WHEAT STORE.—The chairman initiated a discussion on the possibilities of a co-operative store for wheat. He considered there would be great advantages attending the erection of a large store near to the railway, in which each farmer could have his own floor space. The Hon. Secretary thought the past few weeks had demonstrated the value of a store of this kind. Various buyers were giving various prices, and where the wheat was not stored with the firm giving the highest price, the seller missed what might otherwise have been an extra 1½d. to 3d. per bushel. The gain in weight was also an important consideration, especially when wheat was stored in summer and sold in winter. Farmers sheds had been built in Victoria and the system gave satisfaction, therefore, he thought it should here. Members all realised the possibilities of some such arrangement and decided to obtain fuller information and go into details at a future meeting.

Murray Bridge, August 22.

PRESENT.—Messrs. McIntosh (chair), F. W. and J. Lehmann, Nelson, Schottelius, Patterson, Doyle, J. and E. Stecker, Kuchel, Davie (Hon. Sec.), and three visitors.

HORSE-BREEDING.—A paper on this subject was read by Mr. J. Lehmann to the following effect:—"Judging by the average class of horse met with outside the show ring there is yet room for improvement. The best and purest stock well adapted to the end sought is always the most profitable. It costs no more to raise good than inferior stock. The first outlay is of course more, but this is the capital invested from which you receive a profitable return. Good stock will always sell well and realise high prices, whereas

it is difficult to find a market for inferior animals. Maturity in breeding mares is essential, since it is futile to expect to get the best development from animals undeveloped themselves. It is a great mistake to breed from broken down mares with physical and constitutional weaknesses, hereditary diseases, and so forth, simply because such animals can be bought cheaply. If mares of constitutional vigor are selected breeders are always sure of a profitable return and need not hesitate to incur the expense of sending mares a considerable distance to a proper sire. Always select a sire free from hereditary diseases and of good pedigree. It is better to pay a pound or two more and to get the services of a good horse, as his progeny will often realise twice the value. This fact has often been demonstrated. The attention given to the foal is of no less importance than the selection of the parents. Young horse stock well fed will come to maturity at three years old; poorly-fed animals do not reach maturity until four or five years old. I strongly advise taming foals when quite young. This makes them feel at home in the stable, and permits of their being easily fed and handled at weaning time. Do not wean too soon. Many farmers wean their foals at the beginning of the stripping season, but this is unnecessary. Put the foals in a loose box and let them suck the mother when she comes in from work, but not when she is heated. Feed generously and give plenty of water and as much exercise as possible." Continuing, Mr. Lehmann said the Murray Flats were well adapted to the raising of good horse stock. The climate was mild and the winter not too severe, while on the reclaimed river swamps an abundance of green feed, so essential for young stock, could be grown. Holders of river frontages and reclaimed lands could feed green lucerne in the summer and hay in the winter, and no better fodder for the purpose could be grown. There was only one thing they at present lacked, and that was good sires. He approved of the system of stallion inspection instituted by the Government. It represented a step towards the evolution of a higher type of horse, and, as such, was worthy of the hearty support of all breeders. What was needed, in addition, was a stallion licence. Where farmers were not able to secure the services of a good horse they should club together and either purchase a sire on a co-operative basis or guarantee any breeder who went in for a good animal a certain revenue for a given number of years. Both the owner of the stallion and the other horse breeders would reap the benefit of such an arrangement. Considerable discussion followed, in which it was stated that foals should be weaned at six months old. For the production of suitable farm horses for the district it was thought best to mate a blood stallion to good draught mares, and for roadster stock to put a blood mare to a draught stallion.

WHEAT AT MARCH SHOW.—In discussing this subject, it was urged that farmers under ordinary conditions could not compete with men who specialised in the production of show samples in the most favored localities. A division of the country into the following districts was suggested:—1. Upper North. 2. Lower North. 3. The Hills district south of Adelaide west to Callington, and the foot of the Mount Lofty and other ranges, and north as far as Robertstown. 4. East of the line above mentioned, including the Murray Flats, Loxton, Pinnaroo, and South-East. This would give fairly uniform conditions over each district, for which a separate prize should be offered, with a champion prize to include the whole lot.

Renmark, September 13.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. Waters (chair), Braund, Basey, Smith, Muspratt, Wilkinson, Dewitte, Dix, Weste, Huggins, Geneste (Hon. Sec.), and four visitors.

CATERPILLARS.—To destroy caterpillars, Mr. Muspratt recommended axle grease mixed with purple carbolic acid, painted on a paper covering round the trunk of the tree; or a deep furrow cut close to the tree, with a good slanting wall, and a little lime laid in it. Caterpillars could not crawl past this, and the sun killed them. Ordinary fly-papers had been tried, but without success. The dead caterpillars covered the surface, and others travelled over them. Axle grease and insectibane was also a preventive.

ORCHARD NOTES.—*Peach Aphis.*—In reply to a question, Mr. Smith said that thoroughly spraying with a solution of soft soap and resin would be fatal to peach aphis. It also sealed up the eggs, and did no injury to the trees. *Sprays.*—Mr. Geneste asked if it was too late to spray vines with sulphate of iron and bluestone when the buds were out. Mr. Muspratt said they could be sprayed at any time during the summer, so long as the solution was used at half strength. *Apricots.*—Mr. Muspratt found apricots did best on hilly, box country. Mr. Waters said green manuring was excellent for apricots.

Several settlers had tried this with trees that were not doing well, with the best of results. In some cases the green manure brought them right round, and they were bearing good crops.

Rhine Villa, August 26.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. Hecker (chair), Hayden, Deane, Payne, and Vigar (Hon. Sec.).

WHEAT AT MARCH SHOW.—Members suggested the following reasons to account for lack of interest in this exhibit. General indifference, labor involved in preparing exhibit and expense incurred. They thought it would be an inducement to compete if a bonus were given to every farmer who showed a wheat weighing over 66 lbs. to the bushel.

ANNUAL REPORT.—The Hon. Secretary reported that seven meetings had been held, with an average attendance of five members. Three papers had been read. General regret was expressed at the indifference of local farmers to the work of this Branch.

Sherlock, August 31.

(Average annual rainfall, 15 in.)

PRESENT.—Messrs. Whyatt (chair), C. J. and V. A. Osborn, Nock, J. P. and C. E. Tonkin, Combe (Hon. Sec.), and three visitors.

SHEEP ON THE FARM.—The Hon. Secretary read a paper on this subject. Speaking generally, in this district the soil would develop into first-class feed country in the course of a few years, and every settler should take advantage of this fact. Everyone should procure at least a small flock of sheep. They were of great value—directly because of the production of wool and lambs, and indirectly because of the benefit to the soil. In these parts the want of water was the greatest drawback; but a bore could be put down and fitted with windmill and tank complete for about £100. This outlay would soon be recouped with the produce of the sheep. The want of fences was another difficulty. An effective and cheap fence could be erected consisting of a barbed and plain wire above 3 ft. 6 in. wire netting. Carefully put up, this would be vermin-proof as well as sheep-proof. Great care should be exercised in the selection of a flock. He would advocate purchasing 4-tooth or 6-tooth ewes of Merino-Shropshire cross. As a rule these were quiet, thrifty, are good mothers. Mated to a Shropshire ram they would produce rapid-growing, shapely lambs, and with the feed obtainable here the lambs would be fit for early export. Sheep would improve the soil to a very great extent, and coupled with the alternate cropping system would increase the wheat yields enormously. So far weeds had not been troublesome, but the time was not far distant when the crops would be materially affected by weeds. With the aid of sheep they could be kept in check, and therefore all farmers should procure at least a small flock as soon as possible. Members agreed with the paper in so far as the value of sheep to the farmer was concerned. They thought the fence suggested, however, would need three wires instead of two.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, August 16.

(Average annual rainfall, 33 in.)

PRESENT.—Messrs. Chapman (chair), Jacobs, Lewis, Ricks, Kayser, Broadbent, Curnow (Hon. Sec.), and three visitors.

ROAD-MAKING.—Mr. Ricks read a paper on this subject to the following effect:—“In dealing with this subject I shall not touch upon the financial aspect, as that must vary according to local conditions, price of material, &c. The first work is to form the road bed, with the centre 8 in. higher than the edges, and round it off with a good crown. If possible roll the bed well so that the stones will set level. New roads should be made in the spring where practicable, so that the stone may get well set before the wet weather

returns. New roads made at the beginning of winter are liable to be 'ploughed up' with the traffic, and cannot easily be levelled again. Six inches of 3in. metal should now be put down, and on top of this 4in. of very hard stone broken to 1½in. gauge. Quartz mixed with ironstone would do very well for this top layer. Although this method has not usually been followed, it is better than using large boulders for the bed, for with the latter the surface metal becomes ground to powder and makes an uneven surface. To make a good road on swampy country, of which there is a large area on Eyre Peninsula and Kangaroo Island, cut small scrub or titree. There is always plenty of this in those wet districts. Tie this in bundles 2ft. thick and put them close together right across the road; then put the metal on as described above. Spoon drains should be made across roads instead of draining with pipes and small culverts, which often get blocked, harbor rabbits, and sometimes cause accidents. To make a spoon drain, take out the earth from a strip 6ft. wide, sloping it to a depth of 3in. in the centre. Put on the usual quantity of metal as on the rest of the road. This method has succeeded in the district of Mallala, where I helped to make the drains 28 years ago, and also near Port Lincoln, where, after 20 years, the drains are in good order. In the hills I would use large, roughly-dressed stones, laid with the surface fairly even. This would be more effective and less costly than the present practices. If good sand or ironstone gravel were spread over the stones, the spaces would be filled up and no lime or cement would be necessary. How to keep roads in order is a problem. Notwithstanding the difficulties experienced, it is always worth while repairing bad places before the damage has had time to extend. Water allowed to lie in bad patches of road is the worst destroyer. I think we could assist to make our roads better in this locality at little expense to ourselves. If 10 rate-payers would each put down 10yds. of stone each year 100yds. per annum would be done, and in a few years the district roads would be in excellent condition, and the residents and their horses would reap the benefit." The paper was well discussed. Several members agreed that spoor drains were desirable, especially in rabbit-infested country. They quoted several instances locally in which the rabbits had undermined the culverts and caused them to collapse and choke the waterways. Mr. Lewis did not believe in spoon drains. If crossed quickly they would cause accidents, such as broken axles. Other members thought spoon drains should not be less than 15ft. or 20ft. wide. Mr. Lewis did not think the suggested voluntary supply of metal would act. He had always found that some would give, but they had to whistle for the others. Mr. Jacobs thought spoon drains should be not less than 6ft. wide, and made of good pitchpaving or square stones.

Clarendon. August 15.

(Average annual rainfall, 33½in.)

PRESENT.—Messrs. Matthews (chair), White, Hilton, Brooks, Piggott, Sheidow, Wright, Dix, Giles, A. H. C., E., and A. A. Harper, Phelps (Hon. Sec.), and one visitor.

FALLOWING.—A paper on this subject was read by Mr. Hilton. He considered more land should be fallowed in this district. Each paddock should lie fallow every third year, if only to kill sorrel and other weeds. He advised ploughing about 5in. deep in August, afterwards harrowing the soil down well. "The scarifier should be used on the fallow two or three times during the summer to kill weeds. If fallow land was available the crop could be sown three or four weeks earlier than if ploughing had first to be done. The clean seed bed ensured a better crop, and if the land was fairly good and well tilled manure was unnecessary. Even on a small farm he believed it would pay to fallow part, and that the crop from a lesser area of fallow land would give a higher return than the whole area without fallowing. He also was of opinion that it would pay to fallow for pea crops. In the discussion which followed members were divided in opinion. Some thought a judicious system of rotation would pay better in this district unless the ground were dirty with weeds, when fallowing might be necessary. They also considered the soil here should be ploughed not less than 7in. deep, and that it paid to use manures on fallow as well as on other soils.

CLOVER.—In reply to a question, members said clover could be sown with the hay crop, or if sown at once with a little grain to grow as a shelter for it would probably do well.

SOUROPS.—It was stated that, as this weed did not form bulls until after it had flowered, turning it under early and picking the runners where there were only patches of weed would keep it in check.

Gumeracha, September 19.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Porter (chair), Jamieson, Woolard, Moore, Randell, Monfries, Hanna, Kitto, Sandercock, Lee (Hon. Sec.), and two visitors.

VALUE OF UNDER-DRAINING.—Mr. Moore initiated a discussion on "Soil-draining." Some of the best land in the district, he said, was lying idle because of excess of moisture. Soil which in other winters had been quite firm was now a bog, and it was impossible to work it properly. He advocated putting in drains about 3ft. deep. One main drain, to convey the water to the creek, with spur drains about half a chain apart. He thought the cheapest plan would be to use stringybark poles, the longer the better, and cover with leaves or rushes before filling in with earth. Drains put in this way 40 years ago were still working. Mr. Kitto said poles were undoubtedly the best material to drain with. He condemned stone drains or those put in with short timber, as they were often choked by the washing sand. This seldom happened when long timber was used. Mr. Woolard said two men with an ordinary spade and a draining spade could dig out several chains in a day. He did not think the work expensive where timber could be easily procured. He had put in drains with very small saplings over 20 years ago, and they were still working freely. Other members said far greater returns could be won from the land if it was drained. The worst trouble seemed to be the springs on the hillside, which drained into the flats. If these springs could be located, cut, and the water directed, much expense could be saved.

Hartley, September 12.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), W. and C. Brook, Phillips, Paech, Pratt, Stanton, Clark, Hudd, O. Wundersitz, and Bermingham (Hon. Sec.).

WHEAT AT MARCH SHOW.—Concerning the lack of interest taken by farmers in the wheat exhibit at the Adelaide Show, members considered the chief reason to be that the best yielders were not the heaviest wheats. Federation was about the best yielder in this district, and it was generally thought it would be useless to show this grain against Comeback and Petatz Surprise—two wheats which did not yield well here. It was thought that if prizes were offered for the best samples of specific wheats more entries would result.

KILLING MALLEE SHOOT.—It was agreed that February was the best month in which to cut mallee shoots here. They grew rapidly in summer, and if cut at the time stated received a greater check than at any other period of the year.

Longwood, September 17.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes (chair), Furniss, Oinn, Glyde, Pritchard, Doley, Coles (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. Doley. About two acres of fruit trees were inspected. These were about 12 or 14 years old, and had grown to a large size. Members were of opinion that trees planted in gullies grew well for a time and gave good returns, but that when the roots got down into the always wet subsoil the trees slowly died out.

EXPENSIVE SUGAR AND THE JAM BUSINESS.—Members were unanimous in the conviction that the high price of sugar was a great hindrance to fruit-growing. Whilst the sugar-growing in Queensland was protected and fostered, the increased price of this necessity compelled fruitgrowers to seek foreign markets for fruit pulp which ought to be made into jams, preservers, &c., and exported as a finished article of diet.

Lyndoch, September 15.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. Mitchell (chair), Warren, Schrader, Kennedy, Woodcock, Woolcock, Trager, Hammatt, J. Woolcock, Klauber, Lawes, A. and H. Springbett, Lawrence, and E. Springbett (Hon. Sec.).

CURRENT-GROWING.—The following paper was read by Mr. Lawrence:—"A rich chocolate loam, with a red clay subsoil, gives good crops of currants as a rule. The land should be free from all stumps and stones. Plough to a depth of from 5in. to 7in. with a good, strong, single furrow implement, and harrow down as fine as possible for planting. For marking out the rows get No. 8 wire, about five chains long, and attach a piece of thin wire at every 12ft., or at whatever distance it is proposed to plant the vines. Fasten a strong stake to each end, and drive them firmly into the ground, with the wire taut between them. Then plant the vines at each mark along the wire. To mark the next row have poles the desired length, one at each end and one in the centre; measure off, and shift the wire for the next row, and so on. The most profitable distance I find is 10ft. by 12ft. **Cultivation.**—After planting, the soil should be thoroughly worked both ways with a cultivator or with chisel-pointed harrows. To keep the surface fine and loose, and retain the moisture during the summer, this should be done after every good shower of rain up till about Christmas time. The young vines will then hold their own for the remainder of the summer. After the first year of planting, the soil should be ploughed *away from* every row—by marking out in the centre of the row and finishing as close to the vine as possible. Then chop out what soil remains with a pronged hoe. Harrow down finely, and in about a month's time plough back to every row—finishing in the centre. Harrow down afterwards, working with chisel-pointed harrows or cultivator at intervals. **Pruning.**—The young vines should be kept pruned back to the stem for the first two years. The third year they will need a trellis 3ft. 6in. high. Drive a stout stake alongside each vine, and train the young stem up to the wire. When it reaches the wire nip the top off the shoot, and this will cause it to shoot out at the next buds. Tie these to the wire as soon as they are long enough, and by doing this you form the standard arms for the future vine. There are various ways of trellising. I prefer the cross or T-head style, running a centre No. 8 Neptune steel wire for the main arm, and the outside wires of Neptune No. 10. I put the posts about 30ft. apart. This makes a good strong trellis, and should stand for several years without any trouble."

EXHIBIT.—Messrs. Springbett tabled a fine sample of Dunn's field peas, the haulms being fully 4ft. 6in. long. This was grown in a lucerne plot while the latter plant was dormant.

PRESENTATION TO HON. SECRETARY.—An opportunity was taken at this meeting to present to the Hon. Secretary an armchair, in appreciation of his good services in the interests of the Branch.

Willunga, September 3.

(Average annual rainfall, 25½in.)

PRESENT.—Messrs. Pengilly (chair), Wayne, Bigg, and Hughes (Hon. Sec.).

SUMMER FODDER FOR DAIRY COWS.—A paper on this subject was read by Mr. Bigg. It ran as follows:—"The chief obstacle to successful dairying in this district is the difficulty of obtaining green feed during the summer months. The trouble can be overcome, however, by growing fodders such as lucerne, maize, and mangolds, and with the water available these can be produced in quite sufficient quantities to pay. I have had some experience during recent years in handfeeding dairy cows on fodders that I have grown. Maize is an excellent fodder for milch cows. It improves the quality and increases the yield of cream, helps to keep the cows in good solid condition, and gives them a fine shiny coat. It is also very satisfying. To ensure good results the land must be carefully prepared. It should be ploughed deeply and well manured. If the seed is to be sown broadcast the land should be well ridged so that the seed may fall into rows. Seeding may take place at any time from August to about the end of November if water is available for irrigating. I have found the horse-tooth variety of maize very satisfactory; it grows a good stout plant, comes on quickly, and does not require any further cultivation. Maize yields surprisingly well. One season, from the produce of ½bush. of seed, I was able to give a good feed daily to five cows for four months and then left some to go to seed. **Mangolds.**—This is a fodder one seldom sees in this district, and yet it is one of the best that can be grown, on account of its enormous yield of leaves and root. Before sowing the seed the land should be heavily manured with stable manure, ploughed deeply, and worked down fine. Land that has been in potatoes the previous year is the best. Sow the seed in drills 2ft. apart, from July to September. I prefer the long red variety; it is a quick grower and reaches an enormous size. I recently pulled one that weighed 28lbs. As the plants grow they should be thinned out to about a foot apart. Cultivate freely between the rows and keep down all weeds. When the leaves are well grown the lower

ones can be pulled off and fed to the stock. By adopting this method a large amount of green stuff can be obtained and the growth of the root is promoted. When the roots reach maturity they should be pulled and stored in a dry place for winter feeding—if not required for immediate use. I believe mangolds are one of the best preventatives of dry bible on account of their laxative qualities. Stock become very fond of them, and they are splendid milk and cream producers. To estimate what may be obtained from an acre of mangolds, one may space them 2ft. apart each way and if they average, say, 6lbs., the yield would be 30 tons. At a low estimate the leaves pulled would weigh another 30 tons. Including the plants that are thinned out it will thus be seen that between 60 tons and 70 tons of fodder can be produced from an acre within 12 months. It would be hard to find any other plant that will give a result equal to this." Discussion followed. The Chairman, speaking from his experience of mangold-growing, fully agreed with the estimated yield per acre. He sowed the seed with a garden drill and used most of the crop for pigs. He had also tried maize and the cows did well on it.

SOUTH-EAST DISTRICT.

Keith, August 30.

PRESENT.—Messrs. Look (chair), Draper, Thompson, Fulwood, Crouch, Makin, and Dall (Hon. Sec.).

FARMING.—Mr. Makin read a paper dealing with methods of farming in this district to the following effect:—"To be successful in this district the farmer must combine grazing with wheat-growing, and should have not less than 2,000 acres. He could then cultivate 400 or 500 acres annually and keep about 500 sheep. The wool and profits from the sheep would help to pay the expenses and keep the land clear. I recommend large-framed Merino sheep, with a good long staple of wool with plenty of density. When our land has been cultivated longer, and better grass grows a cross with the Shropshire or Lincoln ram may be used. This will give better results, and fat lambs can be raised for market. I have been growing wheat, barley, and oats now for about 10 years and find you must work the land well to get good results. Our sandy soil does not require very deep ploughing, about 3in. to 3½in. being sufficient. Heavier land, however, should be ploughed a little deeper. The furrow should not be more than 7in. or 8in. wide. I find it very necessary to harrow well after the drill. If the ploughs should not make even work it should be cross-harrowed. If the surface is left uneven in our wet winters a good deal of grain perishes in the hollows, or makes poor growth and small heads. I have tried a great many varieties of wheat. Comeback, Federation, Yandilla King, Bluey, and Marshall's No. 2 all do well on our soil. Do not sow too much Comeback, as it is liable to go down. It ripens about a week sooner than most wheat; therefore sowing a limited quantity of this variety gives an early start at the harvest. Algerian oats do fairly well. They should be sown on the best land. English barley is not very profitable, the grain does not fill out enough for malting purposes. Cape barley grows fairly well, and farmers should put in a good portion every year with the first rains for green feed. Crushed and mixed with crushed oats this grain makes splendid horse feed. It is much better than crushed or boiled wheat, and does not cause sore shoulders. Have as much fallow every year as possible to enable you to get crops in early. Be very particular to pickle wheat well. If this is thoroughly done there should be no smut. Change seed every four or five years, and always try to obtain seed from a drier district than your own. I sow ¾bush. of wheat, 1½bush. of oats, or 1bush. of barley to the acre. I have tried various quantities of super., and have decided that from 75lbs. to 85lbs. per acre is the right application. If the land is very poor a little more is necessary. For hay crops mix the seed before sowing. An early and a late wheat mixed with Algerian oats makes good hay for chaff. Stock do well on this, with the addition of a little crushed barley and oats. It is a mistake to stook the sheaves too soon after the binder when haymaking. Let them lie three days before stooking. Hay should not be left in the field, however, longer than two weeks if the weather is fine. Every farmer should be able to grow sufficient hay for his own use after the first year. A paddock for this purpose should be one of

the first things to have his attention. Some people believe in cocky chaff, but give me 10 tons of good hay chaff for my working horses. All farmers who use strippers should save the cocky chaff for loose stock in the winter months. April is the best month to deal with mallee or gum shoots. I find the best way is to knock them off the stump with the head of an axe, or split them off close, heap them on the stump, and when dry burn them. The fire will give a great check to the growth, and if carefully done twice this will kill them." Members agreed with the principal points touched upon in the paper, especially the mixing of two wheats and oats as seed for hay crops.

Kingston, August 27.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. Jackson (chair), Wight, Clarke, England, Evan, Nosworthy, Wilson, Lloyd, Goode, Barnett, (Hon. Sec.), and one visitor.

FENCING.—The following paper on "Fencing" was read by Mr. Wight :—The fencing required for any locality depends to a great extent upon the stock kept in the district. I shall deal mainly with sheep and rabbit proof fencing. It almost invariably pays to erect strong and good fences, as money is saved in the upkeep. Nothing is more annoying than at a busy time to have a fence in a bad state of repair, stock getting out, and perhaps days lost in mustering them. It is absolutely necessary to have good fences about the homestead, as when calves get into the habit of walking through the home fences they become inveterate fencers, and are always in the green feed patch or on the crop. A convenient run of at least an acre should be fenced for the poultry, and, by the way, I would recommend one of the heavier breeds. In this district it is difficult to get timber of a fair length. An efficient fence can be put up by building an ordinary 4ft. wire-netted fence, and then tying with wire to each alternate post a wattle of, say, 3in. diameter at the top, and long enough to carry another 3ft. 6in. of netting. This will make a good high fence, and the bottom netting may be put 8in. in the ground. Some of the old fences in this district are as high as 4ft. 3in., but since barbed wire has come into more general use it has been found that a fence 3ft. 6in. with a barbed wire on top is sufficient for requirements. A good gauge for an ordinary six-wire sheep-proof fence with barbed wire on top is—bottom wire 6in. from the ground, second and third 6in. between, fourth 7in., fifth 8in., leaving 9in. to the barbed wire. I have tried boring holes 1in. from the top of the post and cutting a slot for the barbed wire, but do not think this has any advantage over stapling to the top of the post. It takes much more time, and requires posts 2in. longer. Owing to the district being divided with wire netting fences, and the good work done with the poison cart during the last two seasons, added to the high price of skins this winter, we are getting somewhat ahead of the rabbits. If vermin-proof fences are required, use 1½in. mesh netting 42in. wide; 1½in. mesh would be better, but it is much more expensive. Wood posts are difficult to obtain and cost me delivered at Moolook £2 5s. per hundred. In addition I have to cart them on to the line of fence. Iron posts cost about 33s. per 100 at the same place. These are easily carted and no hole-sinking is required. In stony country the holes can be made with a crowbar. A very efficient fence can be built with one wood post every 24yds., and seven iron posts between, or one wood post every 12yds. and three iron between. This brings the posts 9ft. apart. The iron posts are 4ft. 6in. by 1½in., or 1½in. by 1½in. The distance between the posts is measured with one of them, taking twice its length. The posts are then stood up all along the line. Erect the strainers about six chains apart. These can be above the fence about 3in. In sandy country we require a strainer fully 7ft. long. Some of you may think 3ft. 6in. in the ground is too deep, but I maintain that it is absolutely necessary to be very thorough, as the efficiency of strength of a fence mainly depends on a good stout strainer well put in. Instead of a strut to prevent a strainer from giving I dig a trench at right angles to the line of pull and place in it an old post horizontally and ram it well up against the strainer. If well put in the strainer will not give an eighth of an inch. Having erected the two strainers, put up the wood posts at each eighth iron post; then strain the barbed wire and staple it to the wood posts. The iron posts can now be driven in, taking the level from the barbed wire. Key the iron posts to the barbed wire with short pieces of No. 10 galvanized wire. A hole or slot is provided for this purpose. The other wires can now be drawn into the fence and strained. I tied netting with black wire on to black wire which has been erected from 12 to 14 years, and in no case have I found a place rusted through. Some people reeve a No. 10 galvanized wire through the top of the netting and through the top of the posts. If ever such a fence has to be re-erected, it is necessary to pull all the wire out again, and this

pulls the netting about. It is harder work, and it is very probable that the No. 10 cannot be strained tightly enough. I have seen several instances of this. It is best to strain wire from the centre. In this way each strainer takes the same weight, and there is no necessity to bore the strainers. One wire between that which supports the netting and the ground is sufficient. Unless stock are forced near a fence there is very little (if any) danger of the netting being harmed. The trench should be fully 8 in. deep and the netting put straight down. At this depth a wombat will seldom get through. With a proper plough the trench can be opened to about 6 in., and the bottom cleaned out with the spade. It can be filled in again with the plough. This saves fully 6d. per coil in putting up netting. Tie the netting at and between all the posts. *Gates*.—As it is necessary to have gates rabbit-proof, they must be well made and well hung. Personally I am in favor of single in preference to double gates. It is very difficult to keep double gates in rabbit-proof order. The post to which the gate is hung should be absolutely firm in the ground, so that if it is necessary at any time to strain up slack wires it will not give and throw the gate out of level. It is really safer to hang the gate on an independent post. I have lately made several gates of iron piping stayed with twisted No. 10 galvanized wire, and wire netted; these, I think, are preferable to any wood gate, although they are rather expensive at the outset. The material for a 12ft. by 3ft. 6in. gate costs about 12s., and it takes a day to make a gate complete; but an iron gate will outlast fully three wooden ones. Ten-foot cyclone N gates can be bought for 21s. each in Melbourne. Hook and eye is the best hinge for gates. Iron gates can be hung on very low posts, will not sag, and do not require paint. A gate should be hung a little out of plumb, the head lying rather toward the post. To accomplish this the bottom hook is not driven so far home as the top one; this causes the gate when being opened to rise at the front, and thus it is better able to clear the ground. Under all rabbit-proof gates a good stout log trimmed level on one face should be placed, and metal broken down in the gateway. All fence lines should be cleared fully 6ft. on each side, and in scrub country it is desirable to have fully half a chain cleared. This can be ploughed and acts as a fire break. To my mind the chief word in connection with fencing should be 'thoroughness.'

Kybybolite, September 15.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), Hahn, Lacey, Lloyd (Hon. Sec.), and two visitors.

CLEARING AND RINGING.—In speaking of clearing land in this district, Mr. Bradley said the big logs were the most trouble to get rid of. These should be burned out first, and most of the small limbs would be used in burning the main log. For wheat-growing he thought it a mistake to ring-bark trees. He always had good crops under the trees. The leaves and bark added humus to the soil. When the tree was rung this supply was stopped, and the falling branches were troublesome for years. Messrs. Hahn and Lacey thought it best to ring the trees, as the wheat then grew better. There were also less weeds and wild oats round the trees than elsewhere.

Lucindale, August 27.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. Rayson (chair), Carmichael, McMorron, Johnston, Dow, Langberg, Rivett, Rabbitt, Secker (Hon. Sec.), and two visitors.

LUCERNE.—Mr. Rivett wished to know what was the best time to sow lucerne, and the best seed to obtain. He had had a plot overgrown by grass and killed. Mr. Langberg thought Hunter River seed was best, and advised sowing in the autumn. In spring there were more grubs and other pests, while the autumn-sown crop seemed fairly free from them. He thought the patch of lucerne referred to by Mr. Rivett would prove to be alive if worked. Disc implements were best for cultivating lucerne.

BLOAT IN CATTLE.—In reply to a question as to how to treat cattle when blown through eating green stuff, Mr. C. A. Loxton advised the use of the trochar and cannula, plunged in between the last rib and the hip. In the absence of this instrument the opening should be made with a knife. In some cases pulling the animal's tongue out and thrusting it back several times caused the gas to be liberated and gave relief. Mr. Carmichael had seen the necessary incision made with a pocket knife, putting a goose quill into the hole to let the gas pass through.

Naracoorte, September 10.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Coe (chair), Wright, Wohlers, Bray, Rogers, Tolmer, Langeluddecke, sen., Caldwell, Munro, Loller, and Schinckel (Hon. Sec.).

BLOCKING UP RABBIT BURROWS.—Mr. Rogers said he had tried this method of destroying rabbits in a bad warren, and had found only one burrow opened afterwards. He considered it was worth a trial, but did not think it killed the rabbits. They were hunted out and went somewhere else. Mr. Munro had seen the paper tried, and it acted well, but not in soft ground. Mr. Wright said it was a good plan to fix a piece of wire netting at the mouth of the hole, so the rabbits could see the daylight. They would try to get out through the netting, but would not burrow under it and would starve. Mr. Munro had seen pieces of netting fixed over warrens at Lochaber, and when the rabbits were starving poisoned stuff was put inside the netting and killed them. Mr. Tolmer had put tar into burrows with success. He had tried paper at the mouth of the hole, but without success.

HOW DRAINAGE AFFECTS THE SOIL.—Mr. Schinckel read the following paper:—"We have in this district some thousands of acres of land covered with water for several months of the year. We also have some thousands of acres of wet lands, where the water is not lying on the surface, but just below it, such as we find on portions of the Binnun, Kybybolite, and Hynam Estates. This class of country in the wet months is therefore water-logged, and while in this condition there can be little, if any, circulation of air in the soil. We have two kinds of water, viz., body and capillary. By body is meant water not allowing the air to pass through it, such as water in a hole, on a flat, or swamp. Any water visible is body water. By capillary water is meant sufficient water in the soil to keep it moist, while the soil is able to admit air, but the water is not visible. Air is necessary in the soil for the direct use of plants. Nitrates, a most important element in plant food, are produced only in the presence of oxygen. Oxygen of the air cannot well get into the soil when the latter is filled or covered with water. Wet soils are always cold, because water warms much more slowly than soil. The removing of the excess of water by drainage therefore permits the heat of the sun to warm the soil much more rapidly for the germination of seeds and their growth. Clay soils, when too wet, go closely together, and there is difficulty for the water, air, and roots to pass freely through them, and then when dry they bake and become hard and cloggy. They are difficult to till, and are in every way unsuitable for cropping. If they are ploughed when too wet they become puddled, and there is great difficulty to bring them into good condition again. If the excess of water is removed from these soils, with the weathering process which goes on they become less consolidated, so that drainage becomes more perfect, and the root bed is deepened. Generally crops or grass on drained lands will stand a dry spell in the end of the season much better than on the undrained. Early in the winter, when plants are establishing their roots, the undrained lands are full of water near the surface, and plants do not send their roots down into the stagnant water. They therefore become shallow-rooted. Later on, when the dry weather sets in, the top soil gets a hard crust on it, and the roots being near the surface in the dry soil cannot obtain sufficient moisture for the needs of a good crop. Briefly, drainage makes the cultivation of the soil much lighter work; it hastens growth and germination during the winter months; the soil becomes richer in plant food; and generally it conserves moisture during the summer months." Mr. Schinckel, in referring to the Kybybolite, Hynam, and Binnun country, said there was some fairly wet land there, in which an open drain would be of little use. How it was going to be drained was a puzzle. There was a great deal of country on Kybybolite which had a bottom like cement. A lot of land had clay and gravel as subsoils, and the clay was close to the surface. This would grow good crops if they could get the water off it, but it became water-logged and lost its fertility. Discussion followed. Mr. Wright agreed with the principles laid down in the paper. The soils on the east and on the west of the Naracoorte range were totally different, and therefore required different methods of drainage. The soil from Naracoorte to the coast had a limestone subsoil generally, and was all porous; but on the Hynam side of the range much of it had a clay bottom, which held water like cement. The soil itself set very hard. From Naracoorte to the coast the rising of springs flooded the country. It was the flood waters which brought the springs to the surface and inundated the country. Flood waters did not kill the crops, but the springs rotted the roots. The country across the range was different. There they had higher ground with hollows throughout, which held the water like basins. Ordinary drains were of little use to that country. If they cut through the clay subsoil and filled up with stones, so that the water could get through, he believed it would carry a lot away. Mr. Munro said that the runaway holes in that

country took a lot of water off, but during recent years they had closed up, and this made the country more wet than formerly. He believed if those holes were opened it would do much good in taking off surplus water. Mr. Schinckel said he only desired to show the beneficial effect of drainage on the soil, and was not propounding any particular system for the Kybybolite and Hynam country. There were places where open drains would do good, but there was a great portion which required some other system. If the country was thoroughly broken it would no doubt take some of the water away, and improve the soil. Mr. Wright believed if the clay was broken through the water would get away. Mr. Bray knew from experience of the country referred to that it was difficult to drain. He had a drain through his wheat paddock, but it did not take the water off effectively. The water was confined to the surface by the clay subsoil, and he believed if they broke through the clay into the rubbly stuff the water would percolate underneath. It would be a good plan to make holes as suggested, and drain into them. Mr. Wohlers said a neighbor of his on the Hynam country had succeeded in draining a swamp on his land into a well. This proved that there was a large soakage underground.

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J. P. WILSON,
Minister of Agriculture.

POINTS FOR PRODUCERS.

The Season's Prospects.

The season continues with every prospect of a big harvest, though it is quite possible that last year's figures will not be reached. There are, of course, districts in which the crops are not so satisfactory as could be wished, and in some localities takeall is causing much apprehension. While individual growers will suffer severely in some cases, the crop as a whole is not likely to be materially affected. The almost complete absence of hot winds is allowing the wheat plant to form its grain under favorable conditions. Some districts report injury by frost, and it is somewhat remarkable that from South Australia, Victoria, New South Wales, and New Zealand almost simultaneous reports of severe frost injury are recorded. In the Auckland, New Zealand, district the fruit crop is reported to have been badly affected by frost, while from some districts in New South Wales growers complain that frost while the wheat was in flower will necessitate some thousands of acres being cut for hay. The oversea export of butter for the season now totals 856 tons, which is within a few tons of our previous record for the whole season. To October 31st 134,713 lambs, 29,166 carcasses of mutton, and 3,000 of hoggets have been shipped, as compared with 67,575 of lambs, 14,705 mutton, and 182 hoggets to the same date last year.

The Agricultural Department.

Last month Mr. William Angus, B.Sc. (Director of Experimental Agriculture), tendered his resignation as an officer of the Agricultural Department. Mr. Angus came to South Australia in December, 1904, as Professor of Agriculture, and later was appointed also Secretary to the Minister of Agriculture, and afterwards Director of Agriculture. Mr. Angus is remaining in this State, having taken up farming pursuits at Loxton. The Assistant Director of Experiments (Mr. A. E. V. Richardson, B.A.) has been appointed Acting Director, and the harvesting operations on the various experimental farms, excepting Kybybolite, will be carried out under his directions. In another part of this issue the balance-sheet of Roseworthy College Farm appears, and it is intended in future issues to publish similar statements concerning the other experimental stations.

The Honey Season.

The General Manager of the Government Produce Department states that the prospects for the coming honey season are particularly bright, and that the advices he has received from the various producing districts point to an exceptionally heavy flow; indeed, many predict a record year. Owing to a healthy overseas export trade beekeepers have during the past four years obtained very payable prices for their product, and any surplus after the local and inter-State trade has been satisfied has found a ready sale in European markets, so that year by year there has been little competition between new and old stocks. The formation of the S.A. Beekeepers' Co-operative Union, Limited, working in conjunction with the department, has been the means of keeping up a continuity of supply to the markets established in Europe during what may be termed lean years, and now producers will reap the benefit of this market should the anticipated 1910-11 heavy production be realised. Major Norton has already been advised of the prospects, with the result that orders are now to hand for parcels from different parts of England, Germany, and Holland, where the Trade Commissioner has been making strenuous efforts to introduce our honey. To prevent any glut in prices apiarists are urgently advised to get into immediate communication with the union and the department, so that, if possible, a commencement can be made with the overseas shipments next month.

Thinning Fruit.

The Horticultural Instructor (Mr. G. Quinn) writes:- "Although the crops, both of peaches and apricots, are not heavy this year, there may be instances where it is desirable that the fruit should be thinned. Thinning should be performed before the stones have become properly hardened; that is, they should be in such a condition as to be readily cut through with a pocket-knife without any particular effort. There can be no general rule laid down for how far apart fruits may be placed on the branches of the trees, but very much will depend upon the general vigor of the tree. Attention, however, must be paid to the fact that although one limb of a tree may be carrying a very large quantity of fruit and the rest scarcely bearing at all, it does not follow that the strain of that fruit bearing will be distributed, and consequently the fruits on that branch must be thinned if a desirable size and quality are to be obtained."

Export of Pork to England.

Recently the Dairy Expert forwarded to the Produce Export Depot 10 pigs for slaughter and shipment to Europe. The carcasses averaged 113lbs. each, and were shipped by the s.s. *Dorset*. The Trades Commissioner reports

as follows on this consignment :—" The experimental shipment of pork *ex s.s. Dorset* arrived in excellent condition, and realised top prices on the London market, viz., 4s. 2d. per stone (8lbs.). The carcasses were sent to the Docks Cold Stores, Smithfield, where I inspected them, and also had the opinions of four of the leading experts here in regard to quality. The unanimous opinion was that in every respect the pigs were excellent, and equal to anything that has ever been placed on the market. The dressing was all that could be desired ; in fact, with one exception—weight—they could not fault them. The heavy weight is only a fault as regards the London market. For this market pork should not exceed 100lbs., but pigs of the weight sent would find a ready sale in Glasgow or the North of England ; in fact, had the small consignment under review been in Glasgow we should have realised even higher prices than we did, but the difference would not have paid me to tranship ; hence I sold here. I am not in a position to know whether the price obtained will be considered satisfactory in view of the high prices at present ruling in South Australia, but from what I know of the industry generally I assume that if producers can rely upon getting anything in the neighborhood of 4s. per stone in England it should pay to produce in large quantities."

Raisin and Currant Crops of the World.

Mr. George Robertson, County Statistician, Fresno, California, recently issued the following report on the raisin and currant crops for 1910-11 :—" Owing to unseasonable weather in Europe there has been a general failure in fruit crops of all descriptions, and consequently an increased demand, with higher prices and strong markets. As regards raisins and currants, the following figures speak for themselves :—

	Year 1909.	Year 1910.
	Tons.	Tons.
Spanish raisin crop	30,000 ..	20,000
California raisin crop	70,000 ..	56,000
Smyrna sultanas	50,000 ..	25,000
Greek currants	185,000 ..	127,000
	<hr/>	<hr/>
Total	335,000 ..	228,000

These are provisional estimates made by some of the best authorities, but the final results are likely to be more or less correct, and shows a deficiency compared with last year of 107,000 tons. The Australian crop has not been taken into account, as the results will not be known until early next year, and, so far as this country is concerned, it is too small to be a factor in the case."

Dried and Canned Fruits.

The Trades Commissioner in London advises—"Cables to hand intimate that the Californian crop of fruit is very short this season; this, together with the fact that there are similar reports from Southern Europe, should point to a good market for any fruit which may come from South Australia next season, particularly if they are graded as I recommended in my lectures when in South Australia. To-day I had a visit from an Amsterdam merchant, who informed me that his orders for dried and canned fruits had been cut down by one-third of his usual supplies owing to the short crop. He desired to know if we would be able to quote this year, and also requested to see a sample of last season's sultanas and raisins." Later he reports—"At all times there is a market in England for canned apricots, peaches, and pears at profitable prices, providing the quality is there, *i.e.*, even grading both for size and ripeness, denser syrup, and in the case of apricots thin skins and a good and attractive label skilfully put on. There are thousands of people here who never ask the price when they purchase these lines, but quality every time is insisted on. I am in touch with many proprietors of the better class shops who are prepared to order direct from South Australia if we can only give them what we require for their trade."

Spraying for Codlin Moth.

The Horticultural Instructor (Mr. G. Quinn) writes—"Growers of apples and pears are now busy applying arsenical sprays to the young fruits to protect them from the attacks of codlin moth. For this purpose arsenate of lead has practically superseded all the other forms of arsenical preparations. Owing to the ease with which the standard preparations now on the market may be compounded with water, the ready suspension of the particles in the water and the tenacity with which they adhere to the fruit and foliage are an assurance that this preference will be maintained for some time to come. Notwithstanding the ease with which the particles are suspended in water, it is desirable that the liquid in the spray tank should be agitated from time to time, because the poison is in an insoluble form and consists of small particles of solid matter suspended and not dissolved in the water. There is good reason to believe that the common practice of spraying into the cups of the upright fruits is based on correct observation; consequently no time should be lost in applying the first spraying to the young fruits, because once the calix lobes close in without their inner faces being coated with the poison there remains always a safe area through which the minute caterpillars may burrow into the fruits without any danger of being poisoned. It is true that many pears do not close at the calix, and consequently if the spraying is delayed for a few days longer not much harm may result. There

is published in this month's *Journal* a list of analyses made by the Government Analyst of a number of leading brands of lead arsenates now on the market. These are in most instances good compounds, and in no case are they calculated to do any injury to the foliage of the tree, although the percentage of arsenic in them varies considerably. It may be stated in a general way that in the past the use of a standard brand containing about 15 per cent. of arsenious oxide has yielded good results when used at the rate of 1lb. to 20galls. of water during the early sprayings and a little weaker during the later sprayings. Fruitgrowers can accordingly, after looking at the analyses, adjust for themselves the quantities they may mix in a given number of gallons of water so as to obtain the required strength."

Analysis of Arsenate of Lead.

The following table gives the Government Analyst's results of analyses of samples of arsenate of lead obtained by the Horticultural Instructor under the instructions of the Hon. Minister of Agriculture:—

Container.	Brand.	Seller.	Moisture.	Total Arsenic As ₂ O ₅	Water-Soluble Arsenic As ₂ O ₅	Total Lead Pb O.
2lb. glass jar	"Electro"	E. B. Cox & Co	38.25	20.04	0.094	41.14
7lb. tin . . .	"Austral"	Chas. Wilcox and Co.	34.29	14.64	0.604	44.96
1lb. glass jar	"Our Jack"	G. A. Prevost and Co.	63.51	11.79	0.104	24.51
1lb. glass jar	"Swift's"	Australasian Implement Co.	49.38	14.74	0.100	35.46
2lb. tin . . .	"Bluebell"	Geo. Wills & Co.	45.59	17.08	0.30	33.41
2lb. tin . . .	"Federal"	E. B. Cox & Co.	48.30	12.96	0.14	35.69
7lb. tin . . .	"Disparene"	E. B. Cox & Co.	3.10	17.68	0.34	46.33

Export of Tomatoes from Quarantine Districts.

It has been brought under the notice of the Government that many persons who are growing early ripening varieties of tomatoes under glass and in other enclosures where there are no potatoes grown are prevented, owing to the Federal quarantine restrictions, from sending their produce out into country districts. Communications were accordingly opened with the Federal Government with a view to ameliorating this condition of affairs. and at the same

time the Horticultural Instructor (Mr. G. Quinn), who acts as Chief Quarantine Office for Plants in South Australia for the Federal Government, wrote to the Director of Quarantine, pointing out in detail the position with respect to these tomatoes. A communication has been received from Dr. Norris to the effect that a proclamation is now in course of preparation which will permit such tomatoes being distributed from the quarantine areas, provided that the Chief Quarantine Officer for Plants in South Australia is satisfied that they are not affected by the Irish potato blight. Dr. Norris further states that in the meantime he would be glad if Mr. Quinn would permit such tomatoes to be sold if free from disease.

Curl Leaf on the Peach.

In a bulletin recently issued by the New York Cornell Station, and reviewed in the *Experimental Station Record*, Messrs. E. Wallace and H. H. Whetzel discuss the origin, history, and geographical distribution of peach leaf curl (*Exoascus deformans*), and an account is given of the disease occurring in New York, its economic importance, and varietal susceptibility. The data regarding the susceptibility of varieties were obtained from reports from a large number of growers throughout New York, which showed that the variety Elberta was the most subject to the disease. Experiments were carried out in 1908-9 for the control of the disease in which the trees were sprayed with Bordeaux mixture and lime sulphur compounds of various kinds. It was found that all the fungicides were efficient in the control of the disease, the time of application being the most important factor. In general it was found desirable to spray the trees before the buds had begun swelling in the spring. If the spraying is done early, and with sufficient thoroughness, but little loss need be experienced. The conclusions of the American experimenters are almost precisely the same as some published by the Horticultural Instructor over four years ago. In the August number of the *Journal*, in 1906, Mr. Quinn wrote—"The best remedy for this fungus tried here is one of the many formulæ for Bordeaux mixture. The popular one is 6lbs. of bluestone, 4lbs. of freshly-burnt quicklime, to 45galls. or 50galls. of water. I have tried many experiments with Bordeaux mixture on peach trees, and have secured the best results from 1lb. bluestone and 1lb. of fresh quicklime to 10galls. of water. I have come to the conclusion that more importance is to be attached to the time when this fungicide is applied than to the quantity of bluestone in it. To be effective the tree in all its parts must be drenched with the fungicide just as the buds are opening out, and even after many of the flowers have expanded."

Imports and Exports of Fruit.

During September 7,020bush. of fresh fruits, 39pkgs. of plants, and 1,509 bags of potatoes were inspected and admitted at Adelaide and Port Adelaide, while 604 bags of potatoes were passed at Serviceton under the Vine, Fruit, and Vegetable Protection Act; 482bush. of fresh fruits (chiefly over-ripe bananas) were rejected and destroyed. The exports to inter-State markets examined and passed at Adelaide comprised 7,146bush. of fresh fruits, 2,252pkgs. of vegetables, and 41pkgs. of plants. In addition 636bush. of fresh fruits and 1pkg. of vines were inspected and passed for export at Renmark; 11bush. of fresh fruits at Gawler; 25bush. of fresh fruits, 92 bags of potatoes, and 20 bags of onions at Coonawarra; and 1,061bush. of fresh fruits and 2pkgs. of plants at Salisbury. Under the Commerce Act 1,322 cases of fresh fruits, 390pkgs. of dried fruit, 144pkgs. preserved fruit, and 198pkgs. of honey were exported to oversea markets during the same period. These were distributed as follows:—For London, 5 cases citrus fruits, 197pkgs. honey, 5 cases jam, 2pkgs. dried fruit; for New Zealand, 1,059pkgs. citrus fruits, 388pkgs. dried fruit, and 25pkgs. preserved fruit; for Germany, 10 cases citrus fruits; for India and East, 200 cases apples, 48 cases citrus fruits, 114pkgs. preserved fruit, and 1pkg. honey. Under the Federal Quarantine Act 670pkgs. of plants, seeds, bulbs, &c., were admitted from oversea sources. During October 6,417bush. of fresh fruits, 358pkgs. vegetables, 10,501 bags of potatoes, 529 bags of onions, and 32pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide, while 476 bags of potatoes were passed at Serviceton under the Vine, Fruit, and Vegetable Protection Act; 128bush. of fresh fruits (chiefly over-ripe bananas) were rejected and destroyed. The exports to inter-State markets examined and passed at Adelaide comprised 11,906bush. of fresh fruits, 3,748pkgs. of vegetables, and 20pkgs. of plants. In addition 213bush. of fresh fruits at Gawler, and 927bush. of fresh fruits at Salisbury were inspected and passed for export. Under the Commerce Act 1,182 cases of fresh fruits, 316pkgs. of dried fruits, 72pkgs. of preserved fruit, and 213pkgs. of honey were exported to oversea markets during the same period. These were distributed as follows:—For London, 143pkgs. honey; for New Zealand, 907pkgs. citrus fruits, 310pkgs. dried fruit, 10pkgs. preserved fruit, and 1pkg. plants; for Germany, 70pkgs. honey and 8pkgs. preserved fruit; for India and East, 275 cases apples, 58pkgs. preserved fruit, and 6pkgs. dried fruit. Under the Federal Quarantine Act 603pkgs. of plants, seeds, bulbs, &c., were admitted from oversea sources.

BEES AND FRUIT.

BY T. E. WHITELAW.

The relations that exist between bees and flowering plants is a complex study, requiring a knowledge of botany and microscopy. The subject has, however, an essentially practical side, for it is an undoubted fact that on the perfect fertilisation of flowers depends the productiveness of the world. The absence of seed would be disastrous. Plants and insects are in a large measure mutually dependent, the plants relying on the insects to carry the fecundating dust or pollen from flower to flower, while the flowers supply nectar and pollen which affords sustenance to insects. Flowers are produced by plants in order that seeds may be formed to bring about continued reproduction. For the production of seed a certain portion of the blossom, known as the stigma, must be dusted with the pollen produced by the anthers when it is in a receptive condition. When the pollen grains come in contact with the viscid solution which exudes from a receptive stigma, pollen tubes develop from them and insinuate themselves between the loosely packed cells of the stigma, working gradually downwards through the style, which is in some cases several inches long, until the ovary, or seed-vessel, is reached and fertile seed is developed. Anemophilous flowers are those in which the pollen is carried through the agency of the wind, the grains being very dry and light. It is significant that wind-fertilised flowers do not produce nectar—that bait which is so enticing to insect life. Entomophilous flowers depend almost entirely on the visits of insects in search of nectar for the conveyance of pollen, the grains of which are adapted to readily attach themselves to the pubescence of insects. They are mostly hermaphrodite, or double-sexed, carrying within the floral appendage the anthers and the stigma; some, however, possess these organs on different blossoms, depending on some outside means for the conveyance of pollen. Nature has so constructed them and their method of development that fertilisation by their own pollen is almost an impossibility, while every facility exists for fertilisation by the pollen from some other flower or plant of the same species. Usually the stigma and the anthers develop at different times, so that fertilisation can only be secured from another flower. Of the insects that perform this work the hive bee holds the premier position, owing to the multiplicity of its numbers and the fact that it gathers both nectar and pollen for food. When foraging it confines its visits to flowers of the same species, and thus avoids indiscriminate fertilisation. Bees are not only honey-gatherers; they are also fruit-

producers. Only by ensuring the perfect fertilisation of fruit blossom at the correct period of the season can mature fruit of perfect shape be obtained in large quantities. During the fruiting season orchardists often complain that a certain period of adverse weather prevailing in the spring has spoilt their crop. In many cases the weather has probably not done the damage to the trees in the way imagined, but by retarding the visitation of those fertilising insects to the blossoms has prevented the realisation of a good crop. One hive of bees in the spring often contains 50,000 insects capable of performing this duty. The addition of several hives to an orchard therefore ensures quick fertilisation and consequently earlier fruit. Fruit is simply the envelope that protects the seed. Mature fruit will resist the action of strong winds far better than that produced by imperfectly fertilised blossoms, which speedily become windfalls. In a large orchard after a gale of wind 100 apples were gathered indiscriminately from beneath the trees and carefully cut open and examined. It was found that 89 had been imperfectly pollinated, nine had apparently been fully fertilised, and two were doubtful. The apple is, strictly speaking, five fruits in one envelope, and the blossom from which it comes possesses five stigmas, each coinciding with a division of the coming fruit. These must be properly pollinated to obtain a perfect fruit. Cutting an apple *across* we find five divisions in the shape of a star. If each of the stigmas have been properly fertilised there is a plump fertile pip or seed in each of the cavities. In the event of only four fertilisations having been accomplished the apple will have one of the divisions only partially developed containing only a shrivelled pip or none at all. Most windfalls exhibit this characteristic, and the apple, not possessing strength, falls to the ground with the slightest wind. The argument with regard to bees attacking fruit and removing the sweet contents is now in most instances admitted to be an old-time fallacy, for it does not bear close examination or experiment. Bees do visit broken fruit. The question, however, for investigation is "Who breaks the fruit in the first instance?" I affirm—and it has been borne out by actual experiment—that bees cannot break the fruit themselves, and when seen sucking the contents of fruits they are following the work of some bird, insect, or climatic influence which has pierced the skin. On one occasion I exhibited a hive of bees at a show lasting three days. Above the combs of the hive a glass framework was constructed, to which the bees had free access. The bees were confined during the three days with practically no food. An apple, pear, a bunch of grapes, and two plums were placed in the glass cover, and with one exception remained untouched by the bees, regardless of the fact that towards the end of the third day the bees had to be fed to prevent starvation. The one exception was that on the morning of the third day one grape in the bunch split, and the bees removed its contents, leaving the dry skin hanging in the bunch. Gooseberries are proterandrous, and insects are absolutely necessary for their

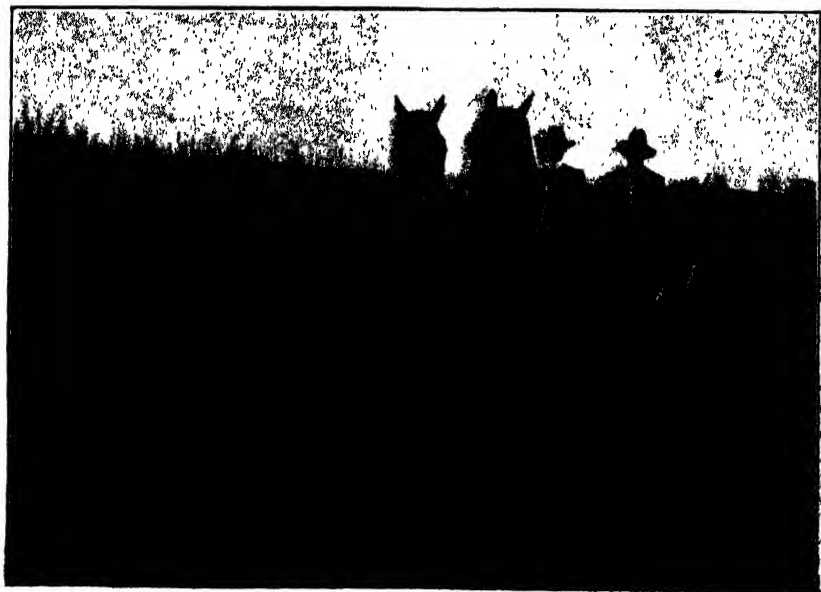
reproduction. Bad weather at the period of blossoming, preventing many bees from visiting them, is often the cause of a poor crop. Currants, however, ripen their anthers and stigmas at the same time, and are said to be less tender than gooseberries. The strawberry requires for its proper development from 100 to 200 distinct fertilisations; the hard, green portions that are found on some of these fruits are due to the stigmas not having been fertilised. To cite an instance quoted by Mr. F. Benton, in a bulletin issued by the Department of Agriculture, Washington. "A case illustrating very clearly the value of bees in an orchard has recently come to my notice, and its authenticity confirmed by correspondence with the parties named, who are gentlemen of long and extensive experience in fruit-growing. The facts are these: For several years the cherry crop of the Yaca Valley in Solano Co., Cal., had not been good, although formerly it was quite sure. This was attributed to north winds, chilling rains, and climatic influences; but in the minds of Messrs. Bassford & Co., of Cherry Glen, the causes did not sufficiently account for all the failures. They recollected that formerly, when cherry crops were good, wild bees were very plentiful in the valley, and hence thought perhaps the lack of fruit since most of the bees had disappeared might be due to imperfect distribution of the pollen of the blossoms. To test the matter they placed several hives of bees in their orchard. The result was striking. The orchards bore a good crop, while other growers in the valley five miles away who had no bees found their crops an entire failure. The following season Messrs. Bassford had some 65 colonies in their orchards." Another instance: Mr. J. C. MacIntyre, a delegate at the Californian State Fruit-growers' Association, reported that a gentleman started fruit-growing 35 miles from any fruit-growing district or where any bees were located. The first year his trees blossomed well, and after expecting at least some return from his orchard, what should be the result but complete failure. He was advised to procure bees to fertilise the blossoms, and in the following season his orchard was very productive.

Mr. Isaac Hopkins (Apiarist to the New Zealand Government), in a bulletin issued by the Department of Agriculture, says—"In the winter of 1882 I started a bee farm at Matamata, and had about 100 colonies of bees when the fruit-blooming season came on. The apiary was located close to a mixed orchard of large trees covering some 10 acres. The nearest bush was about five miles distant, and the orchard being in an open plain there was no shelter for wild bees nearer than the bush, so that it was not at all likely the orchard was visited by many bees. I was informed that, though the trees blossomed abundantly each season they bore very little fruit, and the whole 10 acres did not supply fruit enough for the station. The result in that and subsequent seasons by the aid of my bees was that the trees had to be propped up in all directions to keep from breaking down under the weight of fruit." The introduction of bees into the fruit district of Renmark and Mildura

would undoubtedly increase the production of fruit. The removal of the hives prior to the commencement of the fruit-drying process would be advisable, as the fruit, I understand, cracks and would allow the bees access. Where cracked fruit gives the bees access is the only authentic case I have ever found in which bees are really mischievous. The instances mentioned of the importance of securing the complete fertilisation of the bloom emphasise the necessity for encouraging bee-keeping as an aid to fruit-growing.

A HEAVY HAY CROP, MURRAY VALLEY.

Messrs. Dean Brothers, of North-West Bend, River Murray, have forwarded this photograph of a portion of their crop of Medeah wheat, grown on a heavy blue loamy sand. The land was ploughed 4in. deep, the seed drilled in without manure in May, and then irrigated. These growers have Indian Runner wheat on similar soil over 7ft. in height: this was sown without manure and has not been irrigated. Such results afford strong evidence of the fertility of these soils.



MEDEAH WHEAT, 7ft. IN HEIGHT.

SUMMER PRUNING.

By G. QUINN, Horticultural Instructor.

FULLY GROWN PEACH TREES.

It is desirable at this stage, if time permits, to go through the peach trees, with a view of reducing surplus shoots by what is known as disbudding, and also shortening or removing barren or partially barren shoots which were allowed to remain at the winter pruning season owing to their promise of yielding fruit. It will be noticed on the trees which are kept in a vigorous condition that in many instances the base buds on each side of an older shoot will start into growth simultaneously. It is desirable that some of these should be rubbed clean away, and the pruner must use his judgment in evenly distributing this young growth along the branches by saving such as accomplish this to the greatest advantage. Generally speaking, the shoots which point obliquely or horizontally from the parent branch are to be preferred for future fruit bearing to those which arise vertically from the upper face of that limb. With reference to shoots that have been saved to carry fruit and have failed to set any, these should be cut back in most instances to within two or three buds of their bases, and if this is done now such buds will give rise to healthy shoots during the coming summer. Sometimes with shy-setting varieties it is not desirable to remove so much of the old barren shoot, but rather to allow a longer piece of last year's wood to remain between the young growth and the parent branch. The hardened tissues of this piece of wood tend to exercise a checking effect upon the flow of the sap, and the flower-bearing growths upon it mature more slowly throughout the summer. There are shoots also which have been saved for fruiting which have only set fruits near to their bases. These may be reduced in length by shortening them back to where there is a good healthy young growth arising, but this growth should always be above the outermost fruit which the branch is carrying, so as to draw a quantity of sap through it.

NEWLY PLANTED TREES.

Most trees of deciduous kinds planted during the past winter will have now begun to make pretty vigorous growth, and an opportunity presents itself to regulate the strength of the various shoots which will go to form the main branches of the tree. It will be readily observed that some of these shoots,

usually the upper ones, owing to their superior position for receiving sap, will show direct signs of outstripping their less fortunate fellows. It is to these more rampant growths that a little attention should be given now in the direction of pinching out with thumb and finger the extreme brittle points of such dominant shoots. In a general way this work might be safely done when such growths have reached a length of about 9in. The effect of this is to give a temporary check to the extension of the shoot, the brittle wood of which will soon develop fibrous tissue, and in the meantime the foliage enlarges. By the time this has taken place the weaker shoots which have not been pinched will have made considerable headway, and their terminal points very often almost reach the same altitude as those of a stronger character which have been nipped. Frequently many more shoots will start from the stem of the young tree than are required for the building up of its framework. It is not altogether desirable that any of these should be completely suppressed at this stage unless they arise too closely together—that is, as base buds to some shoot which has been shortened or removed. In such a case it is generally best to select the more suitably-placed one and remove the other, for these rabbit ear like formations tend to produce weak limbs in the course of time. The reason for not removing these surplus shoots absolutely at this stage is that some unforeseen accident may result in the destruction of one or more which have been chosen to balance the tree, and some of these which are retained may be utilised to fill up the circuit. The treatment to be applied to such surplus growths is in the direction of pinching their terminals from time to time so as to stunt them to the advantage of the more favored branches. At the same time the foliage upon these pinched shoots helps in a considerable degree to the elaboration of sap, and often to the shading of the stem from the extreme heat of the summer sun. Sometimes newly planted apple trees have a tendency to start growth from one or two of the upper buds only, the others on the main stem remaining dormant. If they are taken in hand at this stage and a slight incision is made above some of these dormant buds, encircling about a third of the way around the stem in a crescent shape, while at the same time the terminals of the upper shoots are pinched, these dormant buds may often be forced into activity. If no bud is available on the stem a bud taken from a branch of a similar variety may be inserted into the stem, and after it has united be forced into growth by the crescent-shaped incision being made as described above. By this method the balance of the head of the tree may be completed.

THE GROWING AND PREPARATION OF HAY FOR MARKET.

By J. E. KLEINIG.

[Read at a Meeting of Freezing Agricultural Bureau.]

In dealing with this matter it is my intention of treating the earlier stages of growing the crop very lightly, as this part of my subject has been dealt with by a previous writer. There are, however, a few home truths that will always bear reiteration.

To grow good hay it is necessary that the land shall have been well fallowed, bare fallowed for preference; and before sowing the seed the land should be thoroughly cleansed from all weeds, as weeds are the bane of the chaff merchant's business. The selection of seed also is extremely important. If wheaten hay is required, there are several matters to be considered, namely, the sort of wheat, the condition of the seed, and when and how to sow it. The sorts of wheat best adapted for hay are, I think, as follows:—Dart's Imperial (commonly called Bluey) is the best, as it retains a nice green color almost to the roots. White Tuscan comes next in order, as the straw is fairly green, and there is an absence of brown flag, which always spoils the appearance of the chaff. Majestic is also a good variety of hay. The earlier wheats do not, as a rule, make good hay. The only good variety amongst these that I know of is Baroota Wonder. This variety has a fairly solid straw, and, under certain conditions, makes really good chaff.

In growing oats for hay there is not much choice of varieties suitable for the South Australian climate. The only kinds that appear at all successful are Algerian, Calcutta Cape, and New Zealand Cape. The original Cape does undoubtedly make the best hay, but it appears almost impossible to grow satisfactory crops of this kind in our district. New Zealand Dun, White Oats, and Champion have all proved failures, not so much in the size of the crop as the appearance and the quality for hay.

As to the quantity of fertiliser necessary for hay-growing, opinions differ widely. As a chaff merchant, however, I do not think it wise to apply too heavy a dressing—certainly not more than a hundredweight to the acre, for if more is used the crop becomes rank, and frequently goes down with any slight storm, and consequently the hay is much damaged.

Of all the kinds of fertilisers that are procurable, it is, of course, very hard to speak, but I think all will admit that nitrogenous manure is highly desirable.

I have inspected one or two crops sown this season with nitrogenous fertiliser, and the result is extremely satisfactory. It is possible to see the difference a half a mile away. When nitrogenous manures are used side by side with the ordinary superphosphates the result is seen not so much in the height of the crop as in the dark-green color.

In selecting seed it is well to see that you have a good plump grain, and I would suggest that the ordinary seed wheat be graded. In putting seed through the grader not only are the weeds removed, but all the cracked and small grains are taken out, and the seed is then as good as it is possible to obtain. My experience proves that to get a healthy plant it is necessary to sow a plump, healthy grain. In sowing small and cracked grains one not only wastes time in planting the inferior stuff, but the land is also wasted for that season, besides which the small and cracked grains make excellent feed for fowls and pigs.

The time to sow varies considerably in different districts. In our district it is unwise to sow earlier than April, and utterly useless to continue sowing after the end of May if hay crops are desired. Oats should be sown first, and wheat later. Opinions differ as to whether it is wise to sow the earlier variety of wheat first or not. I certainly think that the earlier kinds should be sown first.

I notice that some farmers continue to sow oats and wheat mixed for hay. I think it would be wise to discontinue this practice in future, both from a merchant's and a farmer's point of view. From a farmer's point of view it is not wise, because should wheat be dear and hay cheap it is impossible to leave this crop for grain; and from a merchant's point of view the mixing is bad because it prevents us from putting the very best samples of chaff upon the market. The sowing of oats is, of course, to provide a change for the land, but the sowing of a mixed crop does not accomplish this object.

Before commencing hay-making farmers should be careful to see that their machinery is in good order, and that it is ample for the work required. It is a mistake to imagine that one twine binder can get through successfully more than about 120 to 150 acres in a season, for when the crop is ready it should be cut within a day or two. It is very necessary also to see that sufficient labor is engaged to do the work required. Members will probably say, "How is the labor to be procured, as farm laborers have been very scarce for some years?" I am willing to admit they are scarce, but I still maintain that it is possible to induce a great many more laborers to go into the country and engage in farm work if an adequate remuneration were offered. I know that farmers have been paying much better wages during the last few years than previously, but the average price paid to farm laborers is still lower than could be obtained elsewhere when we take into consideration the number of hours' work, and it is certainly more profitable to pay a high rate of wages for a few weeks during the hay-making than it is to have

your hay bleached or perhaps spoiled by rain. If sufficient labor to make the whole of the crop into hay is not procurable I would suggest that a smaller area should be cut for hay and the balance left for grain, which course would give a longer time to complete the work, for it is better to have a small quantity of good hay than large quantities of inferior stuff.

To produce a really good sample of wheaten hay the crop must be cut when the bloom or flower is on the plant. This, I know, has been regarded in the past by many farmers to be much too early. They have been afraid that by cutting the crop at this early stage they were losing in weight. This may be true to a certain extent, but the loss is not nearly so great as farmers have imagined. Cut while in bloom the crop undoubtedly takes more binder twine to the acre, and would probably yield lighter when measured by loads; but there would be a considerably greater number of loads, and the weight per acre is not so much less as at first appears. Even if the loss of weight were as great as farmers imagine, it would still be better to cut the crop at this stage, as they would then have a nice green sample of hay to offer, and could always demand top rates. If one district could continuously send a nice bright green sample of chaff to Sydney, it would soon be recognised in Sussex Street, and from 5s. to 10s. per ton more would easily be procurable. The old idea that plump grain is required to make a good chaff is a fallacy. Sydney people will have none of it. One of the complaints that we continually receive from Sydney is, "Too much grain and too pale in color." If the crop is cut while in bloom the straw has a beautiful green color, and with proper handling always produces a first-class sample of hay.

One of the most important—if not the most important—of all points in handling hay is the stooking. I have frequently felt surprised when travelling amongst farmers by seeing the hay lying for days and days in rows as the binder left it. This should not be. Hay should be stooked within 24 hours of cutting; otherwise it begins to deteriorate: the sun draws the moisture out, and with it a great deal of the nutriment departs; the sheaves also become bleached on the outside, and altogether the result is a poor sample of hay. When possible, stook immediately behind the binder; make moderate-sized stooks, consisting of from 25 to 35 sheaves, and stand the sheaves as nearly upright as practicable. When the stook is finished take a few moments to press the heads tightly together, for this will in a great measure prevent the wind from blowing the stooks over, and the rain is by this means kept out. Many farmers, when stooking, lay the sheaves down. This is a mistake. In every case when we have bought hay which has been stooked in this manner the bottom sheaves have been more or less musty, and should there have been much wet weather they have been absolutely useless. We have frequently had to leave many sheaves in the paddock, and, on occasions, quite one-eighth of the stook. Now, this is a serious loss, and a source of annoyance to both buyer and seller. In very wet seasons

it might be necessary to make long, narrow stooks, about four sheaves wide only, so that a draught may pass through them and thus draw the moisture out of the sheaves; but this course should be adopted only on extreme occasions, and the very best results cannot be obtained this way.

In normal seasons hay is fit to cart when it has been in the stook about 15 days, and should then be carted—not left to stand in the fields, as we have frequently seen it, for months and months. We have sometimes seen hay in the fields in February, and have known farmers to have the face to come in and offer it as good green hay. Were we to purchase this stuff and ship it to Sydney the result would simply mean financial disaster.

Do not forget that as the hay goes into the stack so it comes out. If you allow it to become dry and like so many sticks, it will come out of the stack the same way—poor, dry stuff, without any color. This cannot make good chaff. It is necessary to dampen or steam it to prevent splitting, and if this is done it frequently goes hot in transit, and if it is not done the cutters knock the stuff to powder, and it is impossible to sell it. But if it goes into the stack with just so much sap in it that it will keep, the result is good, heavy hay, and a satisfactory sample of chaff.

Before proceeding to stack farmers should see that they have a good bed on which to lay the sheaves. Frequently this is not done, or, if a bed is made, it is altogether too thin. A really thick coat of straw should be put down; otherwise the bottom layer of sheaves is always damaged, and in many cases utterly spoiled. We have removed stacks where the second, and even the third, layer of sheaves had become musty through insufficient bed being made for the stack. This is not only a source of serious loss, but causes great annoyance both to the merchant and the farmer. Chaff merchants are frequently accused of leaving stuff which they ought to take, and this in all probability is true; but, on the other hand, we very frequently take stuff which we ought to have left, as all farmers will admit that it is very difficult to determine which should be taken and which should be left when all is more or less damaged. By providing a good bed farmers will obviate both loss and annoyance, as far as the bottom of their stacks are concerned. In building the stacks farmers should see that they have sufficient labor to handle the sheaves properly, and see that each sheaf is placed in its proper place. Do not throw the sheaves about the middle of the stack anywhere, as this is not proper stacking. The middle of the stack should be packed as full as practicable. When I see a stack with the walls built up nice and square, like the sides of a house, and all the corners neatly turned, I look on it with a certain amount of suspicion, knowing that the middle has not been kept sufficiently full and that there is a danger of the rain having soaked into the stack. If a stack shows signs of having slipped here and there I always feel more certain of good stacking, as that is an indication that the middle has been kept full and that the outside sheaves tip outwards. We have removed

some stacks where the rain has damaged a considerable portion of the hay, not through having gone in through the roof, but has actually drawn in from the sides, simply because the outside sheaves were tipped inwards instead of outwards. This is a very important point in stacking.

Frequently, of course, when the stack is partially built rain falls, and in an instance such as this I want farmers to observe very great caution. Up to this point I have been urging farmers to use every means to expedite their work. I have urged upon them to hasten on the work in every possible manner; but just here I want them to pause. In nearly every case after a rain we find when removing the stacks that farmers have commenced carting too soon after the rain, and that a considerable quantity of hay has been damaged thereby. It would probably be a good plan if you wish to hasten on the work and care to take the risk to start on another stack, rather than proceed with the old stack before it is properly dry. I have noticed in the wetter districts of Victoria that farmers build smaller stacks than we do, and I think this course could be adopted in South Australia in anything like wet seasons with a great deal of advantage. A small stack is more quickly built, and consequently there is not so much danger of rain falling while the stack is in course of erection; and I also think that the roof of a small stack is more easily protected than a large one.

Before commencing to roof the stack see that the middle is well filled in. A stack that will turn the rain well requires the middle built up so high that a casual observer would almost imagine that the stack has been roofed. Do this immediately after having laid out the eave, which should be built out as far as is practicable. After having filled in the middle of the stack as high as possible, go back and commence to lay the roof. Personally I believe that the best roof is that with the heads of the sheaves lying outwards. We have roofed several stacks in this manner, and have found that the rain is turned by this means almost as well as when thatched.

I would like to impress upon farmers the necessity of having provided sufficient straw from the previous year's crop to thatch or cover their hay-stacks. This should be done immediately after the completion of the hay making and stacking. Do not delay. We have only to look at what occurred at Roseworthy and Sheaoak Log last year to see the fallacy of leaving stacks uncovered. Owing to the heavy rain hundreds of tons of hay were spoiled, which might have been preserved had the stacks been properly built and covered. In consequence of the indifference or carelessness of farmers in this matter, there are now hundreds, even thousands, of tons of very inferior hay about which might, with a little care and forethought, have been fit to place on the Sydney market, and which, if it were first-class, could now be shipped to Sydney at a price that would give a fair return both to the farmer and the merchant. We have been compelled to turn down very large orders this season from New South Wales on account of quality alone. I do not

propose to deal to any extent with the methods of covering hay-stacks. There are several, all of which, if properly done, will turn the rain. Personally, however, I like to see loose straw put on the stacks, and to do this properly it requires a fair amount of labor. The straw must not be laid on in large forkfuls, but must be scattered finely over the stack, always being careful to see that the tip is to the outside. We have covered many stacks in that manner, and have rarely found a damaged sheaf. It is, of course, necessary to use a great deal of wire for hangers; but this, however, is a mere detail when we consider the hundreds of tons of hay per year which are thrown away through faulty covering. Always bear in mind this fact: that whatever is worth doing is worth doing well. This applies very particularly to the roofing and covering of hay-stacks.

I want to impress upon the farmers the fact that we have now very much keener opposition in both Victoria and New South Wales in the production of chaff, and that unless we can produce and put upon the market chaff of prime green quality it is quite useless for us to hope to retain our trade with New South Wales. To hope to ship second grade chaff to New South Wales in the future is quite useless, as Victoria produces and puts upon the market second grade chaff at a much lower price than we seem to be able to do it. Bear in mind that the future of the hay and chaff trade in South Australia depends upon color and quality. It must be quite green and sweet, or we can find no market whatever.

In conclusion I want to point out that I have approached this matter in no spirit of criticism of what has been done by the farmers in the past. I have merely pointed out what appeared to be grave faults with the methods adopted in handling hay and preparing it for market. I cheerfully admit that many farmers produce a really good sample of hay, but we cannot rely upon a regular sample of hay to produce a regular sample of chaff for market. We can rarely commence a farmer's stack and take it away at once. We have to try one load from this farmer and another from that, so as to be able to get something like a regular sample of chaff. If the methods adopted by farmers were more systematic, the possibility of opening a stack and taking it away without leaving cuts open to be exposed to the weather might be realised.

POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert.

TABLE POULTRY.

During the last four or five years there has been a most marked increase in the consumption of and demand for table poultry of good quality. During the last few months the prices obtainable in the Adelaide markets have been excellent, while at the time of writing prime chickens are readily selling at what a few years ago would have been considered absurd prices. The fact that people can afford to pay these prices may be partly due to general prosperity. During many years I have frequently stated that South Australians would gradually be educated to the value of good poultry as an ordinary article of diet. With the growth of the poultry industry and the general spread of interest in poultry, it was to be expected that more people would be accustomed to poultry on their tables. A slow process of evolution is enabling the consumer to emerge from a monotonous diet of beef and mutton, and now many families would on no account do without the regular supply of poultry. People who are accustomed to a particular kind of food will somehow or other find the money wherewith to pay—this is satisfactory to the breeder. Another important point is this: In former years the percentage of presentable table poultry on the market was very small, and generally not in the way of the general consumer. The average farmer did not send in any poultry to market unless it was old and tough. People who, after many efforts in the cooking domain, at length brought to table one of these antiques often found their powers of hewing and dismembering overtaxed. Then the diners, unless well blessed with sound teeth, found that the so-called poultry was far tougher than anything yet essayed in the meat line. They generally came to the conclusion that poultry of this old-time description was not worth eating. The demand was therefore limited to such seasons as Christmas and Easter, picnics, and special feasts, at which some people are not happy unless consuming time-honored viands.

Now the general class of table poultry is much better, and there are numerous breeders who send in to market large numbers of fairly fat, young birds. For these there is good competition among numerous poulterers, who, as a class, are quite new to Adelaide. Five years ago there were only two regular poulterers in the city; now there are many.

THE EXPORT MARKET.

A good market has been found in England, and during the last four years excellent prices have been obtained for all suitable birds shipped. Good white ducklings average about 7s. a pair, equal to 5s. 8d. a pair here. Prime, well-fattened chickens sell readily at 11d. a pound, so that a 4-lb. chicken will net 3s. 1d. here, or 6s. 2d. a pair. There is a huge market in England for as much prime poultry as can be shipped. Up-to-date breeders are reaping the advantage of shipping. Many farmers could add materially to their incomes by following this example.

I am now organising a table poultry show to be held early in February. The prize list is liberal and the entrance free. A condition is that all exhibits passed as suitable must be exported. Circulars, with full details, can be had on application.

LAYING COMPETITIONS.

The present laying competitions at the poultry stations at Roseworthy and Kybybolite will terminate on March 31st next, and on April 1st (next day) another test will begin. Copies of regulations and entry forms (fee 10s. per pen) can be had on application.

As regards Kybybolite, South-Eastern members of the Bureau and others are asked to co-operate and enter sufficient pens to fill the test—50 pens—as we wish to limit it to South-Eastern breeders. The interest taken in the South-East in this poultry station is gratifying, and the good effect among the breeders is freely acknowledged. There have been some comments about the egg production at Kybybolite, and as many readers may not know, it is well to say that there is a very cold clay subsoil which undoubtedly affects laying in the winter; this is the case at other places in the South-East besides Kybybolite. Foolish references have been made, and threats that the “leading breeders” will not again enter because the poor scores are “spoiling their reputations.” Breeders and fanciers should, however, understand that laying competitions are not organised solely for their benefit and to enable them to get cheap advertisements and win prize money. It is all very well to say that these competitions show who has the best fowls—they certainly show who can put up six good layers. It is further stated that owners of such high-class layers will distribute eggs and stock of great value. On the other hand, there are many who desire to build up laying strains so that they may own flocks of profitable fowls. These enter pens in competitions so that an actual comparison may be made. This is the class of breeder whom it is desired to help.

I am quite satisfied that, for the district and climate, the birds will put up a fair record. Five years ago it was stated on all sides that it was too cold for poultry in the South-East; but we find they do very well at Kybybolite, and in that case will do better anywhere else in the South-East.

The numerous visitors to the station are evidence of the general and increasing interest in poultry, and the numerous applications for stock and advice show a satisfactory state of affairs.

At Roseworthy, although the weather has been changeable and not too propitious, the laying has been most satisfactory. At both stations the health of the birds has been excellent. The records in this respect during the existence of the poultry stations is proof that with proper attention large numbers of fowls can be kept in confinement with very slight losses through disease.

DISEASES.

With the advent of warm weather there is generally an increase in bowel troubles among poultry. Preventive means can be taken to avoid many such troubles. The water supply is of the utmost importance. The drinking vessels should be kept scrupulously clean, and periodically should be scalded and disinfected with a solution of sulphate of copper (bluestone); 2ozs. to the gallon of water will make a solution of sufficient strength; a supply may be kept in bottles. Renew the water twice at least each day, and as often as required in hot weather. Keep cool and well shaded. In case of trouble write at once and an immediate reply will be furnished.

GREEN FOOD.

Although it is late to make provision in certain districts, still the importance of a supply of succulent¹ green food cannot be too strongly emphasized. Lucerne, which will grow almost anywhere, is the most valuable poultry fodder we have. Kail, green maize, and silver beet, rape, &c., can be grown in small plots, and where water is available will yield heavily.

SHADE.

Poultry of all sorts must be provided with shade. These may be made according to the inclinations of the individual. Cheap but effective shades may be made as follows:—Plant forked sticks in the ground, allowing a height of 2ft. 6in.; put in the forks bearers, and on these cross bearers; cover with wire-netting; on this place long straw to the depth of 1ft. and keep in place with wire or wire-netting. Several of these shades may be erected on the farm, or one of suitable size in each yard.

POULTRY TICKS AND VERMIN.

These should be eradicated without delay. Under the Stock Diseases Act persons having tick-infected premises are required to eradicate this great pest. Kerosine is an effective agent, so are many sheep dips.

BITTER OR BROWN PIT IN APPLES AND PEARS.

[Extracts from August, 1910, issue of *Cape of Good Hope Agricultural Journal*.]

C. P. LOUNSBURY, Government Entomologist.

Bitter pit is probably the most serious trouble of apple fruits that at present confronts the South African fruitgrower. Other troubles, such as codling moth, fruitfly, fusieladium, and bitter rot, are capable of causing far greater losses in some or all parts of the country, but they are troubles that can be guarded against by timely sprays.

Bitter pit has attracted attention in Europe, America, and Australia as well as in South Africa. In California apples are at times badly affected.

If Mr. Evans's explanations of the cause of the trouble are accepted, and they appear most plausible, the cool nights that are so characteristic of the summer climate in most parts of South Africa probably have much to do with the case, and also the strong dry wind that so commonly blows during summer afternoons. At least it may be said that the trouble seems more or less severe in association with the degree to which the tree through climatic and other conditions is subjected to sudden changes in the rate of transpiration; that is, evaporation from its surface.

CAUSE.

Neither insects, fungi, nor bacteria are associated with bitter pit. The disease, if disease it may be called, is due to the failure of parts of the fruit substance to withstand the stress of the conditions to which they are subjected. The strain is greatest on the tissue bordering the channels (vascular bundles) which convey the nutrition and near the surface farthest removed from the stem, and groups of cells succumb to it. Different authorities have offered different explanation, in regard to the precise nature of the strain, and it seems not unreasonable to suppose that similar superficial results, to which the name bitter pit may be properly applied, may arise from different combinations of adverse conditions. In other words, the true explanation on one occasion may not be true explanation on another occasion. However, it seems safe to accept the explanation advanced by Mr. I. B. Pole Evans, the Transvaal Plant Pathologist, for the most of bitter pit that occurs in South Africa. Early in 1906 the Cape Colony Department of Agriculture, at the suggestion of the present writer, arranged for Mr. Evans for a technical investigation of the trouble. The investigation was conducted under many

disadvantages, but finally resulted in a report which is a very valuable contribution to our knowledge of the subject from a technical standpoint. This report was issued several months ago as Technical Bulletin No. 1 of the Transvaal Department of Agriculture, and, although the number of copies printed was rather limited, one would probably be sent on application to any party particularly interested. After stating what was revealed by his study of the affected tissues, Mr. Evans wrote—"These facts, together with the general appearance of the spots, lead me to conclude that this unhealthy condition of affairs is brought about by the following sequence of events. The cells surrounding the vascular bundles, or those commonly situated at their ends, are being continually subjected to great internal pressure, with the result that they become enlarged and thicker walled. This internal pressure is undoubtedly due to an accumulation of water, which inflates the cells to such a pitch that in many cases the tension becomes so great that the cells can no longer withstand the strain put upon them, and consequently burst. As soon as the cell is ruptured, atmospheric oxygen gains access to the cell and, together with the enzymes present, act on the tannin, producing dark-colored oxy-compounds, which are precipitated on the walls as a gummy substance, while any further diastatic action is inhibited, with the result that the starch grains remain unaltered, and are always abundant in the vicinity of the necrotic areas. As soon as a few of the cells bordering on the vascular bundles, or those situated at their ends, are ruptured their neighbors surrounding and depending upon them for their water supply are immediately affected and consequently suffer also, with the result that a nest of unhealthy and dried out cells become one of the dry and tough bitter pit spots. The collapse of these cells in the interior of the fruit eventually leads to the characteristic depression or pit on the exterior."

Later on he says that the great internal pressure of which he writes is set up by external conditions to which the trees are exposed, and that the injury results in the case of trees which are not plastic enough to adapt themselves to their environment. Then he states—"The main factors that are responsible for the spotting are believed to be excessive transpiration during the day followed by its sudden checking and complete abeyance during the night, when root action is still vigorous owing to the warmth of the soil. Under these circumstances water accumulation takes place to such an extent in the cells of the fruit that an actual bursting of the cells may occur."

KINDS OF FRUIT AFFECTED.

Bitter pit is pre-eminently an apple trouble, and it is rather uncommon to find much of it in other fruits. The pear and the quince are the only other fruits that have been observed to get affected at the Cape. The manager of the Cape Orchard Company says that he has seen it most frequently in the Keiffer, Beurre Diel, and Easter Beurre pears, and rarely in any other

variety. He had affected fruits examined by Mr. Pole Evans a few years ago, and the latter was satisfied that the trouble was of the same nature as that so common in apples. The spots were often much larger than is usual in the case of apples. In the present season practically the whole crop in a young Easter Beurre orchard near Stellenbosch was affected. Most of the fruits showed no surface discoloration, but, on peeling them, typically dry and brown areas were found thickly distributed over the half away from the stem. The spots varied from an eighth to a third of an inch in diameter and some were fully half an inch from the surface. Mr. McAlpine, above-mentioned, says (*Journal of Agriculture*, Victoria, July, 1909)—“In the case of pears the bitterness is very pronounced, resembling that of quinine.”

STOCKS.

The more the writer looks into the matter, however, the less he feels that the use of the Northern Spy stock increases the trouble. The relative immunity of Tasmania is with almost no doubt due to its cooler and more humid climate. The Northern Spy is practically unknown as a stock in Europe, California, and the Eastern United States, and until within recent years it was not used in South Africa. The varieties which are much subject to the trouble pit apparently as badly on the stocks that were used in this country before the Northern Spy was introduced as on the Northern Spy; and the old Cape sorts do not pit when they are put on Northern Spy stocks if they did not pit before. Some old Cape varieties, as, for instance, the Tom Putt, pit rather badly. The very fact that the Northern Spy itself is very subject to the trouble is against the suggestion that there is a lack of affinity between the Northern Spy stocks and varieties which pit badly on them. Mr. H. E. V. Pickstone has 1,000 four-year-old Versvelds on Spy stocks, along with 1,500 of the same age on seeding roots in his orchard near Cloccolan, in the Orange Free State. About 5 tons of fruit were taken from the trees this season, and the writer has been assured that there was no apparent difference in the degree of spotting between the fruit of the trees on the one class of root and that of the trees on the other.

AGE OF TREE.

That young, vigorously growing trees are more likely to produce fruit that pits than mature trees of the same varieties has been observed in Australia and South Africa. The writer, however, does not think the difference of much practical importance, and it is not nearly so great as the difference there may be between the fruit borne in two successive years on the same mature tree. Under ordinary circumstances a tree which produces a high percentage of badly pitted fruit when young is not likely to outgrow the fault satisfactorily. The fruit of trees of upwards of 20 years of age (and this implies that they cannot be on Northern Spy stocks) from a certain

rather large orchard near Cape Town is known to have pitted in storage this season to a most shocking extent. The small quantity from the same trees that was stored last year is said to have kept without developing a material amount of the trouble.

SITE AND WATER SUPPLY.

The site of the orchard and the time and quantity of its water supply, whether by rainfall or irrigation, is said to have a decided influence. The Ohenimui is a variety which has the reputation of being particularly resistant to the disease. Mr. F. J. Harper, the manager of Mr. H. E. V. Pickstone's extensive apple orchards at Platkop, near Clocolan, in the Orange Free State, reports that this variety kept quite clean with him in the present season, while last year about 30 per cent. of the fruit developed the pit. The crop was about the same size, and the difference in behavior is thought to have been due to the difference in rainfall. The 1909 season was an extremely rainy one in that part of the country, and the orchard soil became excessively wet. Mr. Quinn, of South Australia, in his article on this disease, states—"The fact that the defect is much more prevalent in sorts liable to the injury when they are planted in the wet districts where the rainfall ranges from 28in. to 40in. per year, is now so thoroughly demonstrated that planters of late years have begun to restrict the numbers of those varieties in such localities. Unfortunately, by doing so they are compelled to discard several of the best varieties which have been proved highly profitable both for oversea export and late keeping for the local markets."

The same writer cites a case of a low-lying part of an orchard becoming over-wetted by a flood in February, with the result that the trees there produced many large badly pitted fruits, whilst the crop of the trees on the dry ground in the same rows was practically free from the trouble. Mr. D. J. Joubert, a well-known Cape fruitgrower, whose orchards are close to the village of Ceres, stated in a recent letter that he regarded over-irrigation and too rapid development as the cause of bitter pit. In support of the conclusion he stated that there was very little of the trouble in his orchards, and that little was restricted to fruit on vigorous shoots, whilst in the village where the use of water was excessive the trouble was quite bad on many varieties.

An excess of moisture, however, cannot possibly be the sole cause of bitter pit, and apple-growers, who are now sure they can prevent it by judiciously regulating the supply of water, are likely to have a rude upsetting of their views in the course of time. Somewhat curiously the disease in Europe is associated with light soil in times of drought. The Cape Orchard Company's crop was practically free of the defect when harvested this year, and in explana-

tion of the improved condition over the state of affairs a few years ago the manager wrote—"There are several reasons that may account for our immunity from bitter pit, namely, (1) the increased age of the trees; (2) less irrigation; (3) better cultivation. Last year we noticed that there was comparatively little bitter pit, and this year, as I have already mentioned, there is practically none. I am inclined to think that all three causes have a great deal to do with it. You will remember that when the trees were younger bitter pit was certainly worse, and at the same time they were getting more water than they had last season. None of our apple orchards have been irrigated more than twice, and some of them only once this year. Still I am inclined to the opinion that the older the trees are the less they are liable."

Six weeks later the manager wrote again in response to an inquiry, and stated—"So far, we have taken very little out of cold store. I may say, however, that I am sadly disappointed in the quantity of diseased fruit in the cold stores. At the time of picking I thought that we were going to be almost free from it, but I see now from the small quantities that we have taken out that the disease is as bad as ever. The disease has developed almost entirely whilst in store, as when picked the apples seemed to be practically free."

Quite commonly the poorest nourished of a cluster of apples is much pitted when the others are apparently clean, and often the apples on the sunny side appear more affected than those on the side away from the sun. It may be that the injured tissue merely dries out more rapidly in these cases.

What may prove to be a more reliable guide is suggested by Mr. F. J. Harper, of the Platkop orchards, earlier referred to in this article. He writes—"Up here we seem to want trees possessing a small leaf surface area, as the greater the leaf area the more tax there is on the root system during the day. In support of this Jonathan, Syke House Russet, Wemmer's Hoek, York Imperial, London Pippin, Rome Beauty, White Winter Pearmain, Ballarat Seedling, and Ohenimuiri are either sparsely or small leaved; while Cleopatra, Versveld, Blenheim Ornage, and others that bitter pit are heavily foliated."

If Mr. Harper's observation is found to hold true in general, it might be worth while to inquire into the apparent exceptions. It may be that some strains of a particular variety are less subject to the trouble than others, depending upon the density of foliage. The Northern Spy, it is interesting to note, form a dense top. With regard to the relative liability of firm and soft fleshed varieties, it is to be noted that some hard, good-keeping sorts, as Lord Wolseley, are quite as much liable as some softer-fleshed varieties, as Rome Beauty and Jonathan.

EXTRACTS FROM TRADE COMMISSIONER'S REPORTS.

FROZEN MEAT FOR GERMANY.

"There is no doubt, as I have previously advised, that Germany must in the very near future admit frozen meat. I would respectfully suggest that the time is approaching when Australia should make a united representation to the German people, and in some way endeavor to dispel the idea suggested by the German Minister for the Interior, that the frozen meat is not infrequently of inferior quality, and that its introduction is dangerous on sanitary grounds. I know from personal experience that the above opinion is very generally accepted on the Continent. I say 'a united representation' because the method I would suggest would be too expensive for one State, whereas if all the States contributed it would probably be feasible. I am of opinion that in about six different places in Germany showrooms and information bureaus ought to be opened, particularly in Hamburg and Berlin. In Berlin I even think it would be advisable to appoint a representative who is well known and well introduced in Government circles, and also acquainted with the newspapers. Other places suggested to me as being suitable for information bureaus are—

"1. Bremen-Elberfeld, as the centre of the most thickly populated part of the Rhenish industrial district.

"2. St. Johann Saarbruellen, in the mining district of Saar.

"3. Gelsenkirchen or Dunsburg, for the Westphalian Mining District.

"4. Chemnitz, for Saxony.

"5. Maunheim, for South Germany.

"The reason why such offices should be opened in the various parts is the fact that Germany, as you know, is a federation of various States, and some of the States in Southern and Western Germany, as also in Saxony, have a greater interest in the free import of foodstuffs than Prussia, many of which provinces are purely agricultural and necessarily opposed to the introduction of meat. The former, being chiefly industrial States, the Government, if properly approached, would no doubt bring pressure to bear on the Imperial Government in Berlin.

"A gentleman of high standing in the commercial world in Germany was introduced to me, and he informed me that only this week several of the Liberal and Democratic newspapers, and also Socialist newspapers, are full of complaints about the excessive prices of meat, and there is no doubt that these three parties will make this question one of the principal propagandas for next year's Reichstag elections. This gentleman also said that when in

Southern and Western Germany last week everywhere there was a firm conviction that instead of the 53 Socialists now in the Reichstag 130 will be returned, and it is chiefly all the industrial parts of Germany which will vote for the Liberals and Socialists. The bureaux suggested should have pamphlets showing all the conditions under which Australian meat is treated, because it must not be overlooked that the German Government, as well as the public, are absolutely ignorant of the possibilities and enormous advantages which would accrue by importing cheap and healthy Australian meat, as no imports have ever taken place in the country. I am prompted to make this suggestion by the fact that other countries are already doing something similar with other goods. For instance, I understand the Ceylon Government have given a German firm 100,000 rupees to advertise Ceylon tea in Germany. They have opened a number of tea shops throughout Germany, and, although probably the results so far are not in proportion to the outlay, nevertheless there is a gradual increase in sales.

"I trust that some such scheme as I have proposed will be favorably considered, because if frozen meat were once properly introduced into Germany I think it would be many years before we would be met with what so often occurs now—a glutted market.

MEAT FOR SPAIN.

"Although, in comparison with the possibilities in Germany, anything which is likely to be consumed in Spain is infinitesimal, yet I think the fact that we are able to say that frozen meat if favorably considered in Spain will materially assist us in introducing it to other European countries.

"I have practically completed arrangements for the introduction into Barcelona, which will have an annual consumption of about 30,000 carcasses. In this connection I would strongly recommend that the South Australian Government make a present of, say, 50 carcasses of mutton to the Barcelona Government for distribution. The cost would be very little in comparison with the advertisement we should obtain through the local press.

LAMB.

"I have heard of several lines of f.a.q. Adelaide lambs being sold at 4½d. to 4¼d., September shipment, London.

"The above prices are equivalent to 4-5/16d. and 4-7/16d. on this market.

WINE.

"The following extract from the London *Morning Post* is rather a sweeping criticism on South Australian vignerons. I think this only emphasises the necessity of bringing before the British public the excellence of the quality of some of the wine produced in South Australia:—'The Australian wine

position may be stated the more freely now because the evils under which the industry suffered are being remedied. The position was put clearly in an Australian paper not long ago : " Australia is much blessed with sunshine for the making of good grapes, and much cursed in its winegrowers. It is as though God sent the sun and the Devil sent the vignerons. Sun is the essential element of wine. In proportion to its sun contents will wine bring sunshine to the heart ; yet in Australia most winegrowers have up to recent times striven deliberately to get as much mud as possible into their grapes. They have planted vines not on sun-kissed soil, hungry hills, where the aspiring plant would grow poor in body and rich in mind, but on fat river flats, where grossness climbed with the sap." That was the position a few years ago. Of late there has been more wisdom and better wines. But there remains a great deal of the tradition and a great many of the old vineyards, and it is still, unfortunately, a fact that Australia is not in a position to send out for export any great quantity of fine white wines. In the country itself excellent Burgundies, very good clarets, and passable hocks can be got ; also champagne of a fair quality has been produced. In the future undoubtedly Australia will be a very great wine-producing country ; for the present it will not be a serious competitor in the British market, except as regards strong full-bodied wines. It cannot be looked to for supplies to meet a famine in fine French clarets and sauternes.' "

EUCALYPTUS OIL.

Major Norton recently received a letter from a prominent chemist informing him that he is anxiously awaiting a further supply of South Australian eucalyptus oil, as he is introducing a line of cough lozenges chiefly composed of honey and eucalyptus. This chemist states that he has made a purchase of 100,000 tins for these lozenges, and that he is able to retail them at 1d. per box. During the first week of offering them our client reports having sold 6,000 tins retail. He also states that on a Saturday at Chorley, Preston, and Bury, three manufacturing centres in Lancashire, he, together with two assistants, sold 2,300 packages of South Australian honey toffee of various sizes and prices. This augurs well for the future of our honey trade in the Manchester District.



THE LAMB SEASON.

By G. A. W. POPE, General Manager, Government Produce Department.

The 1910 lamb season has now advanced to such an extent that it is possible to approximately gauge the total quantities likely to be shipped for the year.

Already 135,000 have been treated for export, and by careful comparison and from conversation with buyers who have travelled throughout the State the department considers that there may be another 85,000 available, making in all a total of 220,000.

These figures show that the trade has been given up by very many producers, due, no doubt, to the fact that prices have been gradually falling until those ruling last season were judged to be unpayable. The output will be 51,000 short of the record season of 1907-8.

The season has been one of the most favorable ever experienced for feed, and many are now regretting the haste they displayed in dropping the industry, because there has been a complete revival in prices in the English markets, and buyers have been abroad locally paying handsomely for "prime lambs."

Temporary fluctuations will from time to time be experienced in the world's meat markets, but producers are already keenly buying breeding ewes for service next season because the lamb trade has splendid prospects, especially as we are very near the time when the Continent will open its doors to frozen meat. When this happens mutton and beef will be worth good money to our State.

In addition to the number of lambs mentioned the department has treated 32,000 hoggets and sheep this season. These were mostly purchased in the wool, and now that shearing is over exporters find it impossible to deal freely at the prices asked for fat shorn sheep. As there is an abundance of fat stock in the country it is anticipated that a considerable additional quantity of sheep will come to the works for oversea shipment.

The Adelaide market price, however, is at the present time well supported by graziers, who are buying considerable quantities of stores.

Discussion has taken place as to the want of facilities for handling the output at the Freezing Works, and now that the rush is over it is only fair to state that the department has met every emergency and has not blocked or limited any market during the season. Producers may rest assured that the works are capable of handling the State's output for many years, and it is hoped that before the next season opens it will be so arranged that there will be no scare such as was recently raised.

The responsibility rests in a measure upon all interested. All must therefore work for the proper running of the great lamb industry.

ADVISORY BOARD OF AGRICULTURE.

On Thursday, October 27th, the members of the Advisory Board paid their annual visit of inspection to the Roseworthy College, there being present Messrs. J. W. Sandford (chairman), A. M. Dawkins, W. H. Gillard, C. Willcox, C. J. Tuckwell, C. J. Valentine, W. J. Colebatch, J. Miller, G. R. Laffer, and the Secretary.

In the inspection of the plots from hand-selected seed takeall was noticed in a number of places; in fact, small patches of this disease was observed in a number of fields. The extremely wet winter has seriously affected a number of these small plots. Rust was observed on the flag of a number of varieties of wheat, but apparently was not likely to do any real injury, as the stems were quite clean. The field containing lucerne, the seed of which was sown last year in the cereal crop, was looking well, in spite of the large number of sheep that have been grazing on it. The wheat crops generally looked promising, and the Principal anticipates a yield of grain equal to that of last year. Stock were all in thriving condition, and the heavy growth of herbage in the paddocks was commented on. The hay and barley crops are also looking well. Considerable interest was manifested in some pot experiments undertaken to test the benefit (if any) of different compounds of manganese on wheat, and also the effect of disinfecting the soil by means of heat and different germicides. Of the latter series the beneficial effect of heating the soil was very marked.

After the inspection formal business was transacted. The following gentlemen were approved as members of the undermentioned Branches:— Messrs. B. Lymn, T. A. Barnett, T. Doolan, and T. Moore, Merghiny; G. Evers and O. Powell, Salisbury; F. W. Barnett, J. H. Smith, and E. P. Coe, Kingston; H. Tralaggan and B. H. K. Dunston, Mount Bryan East; W. Carrick, W. Gregory, jun., and F. Oswald, Mitchell; J. Hurst and E. French, Morgan; H. Rehn, P. N. Rehn, A. Ross, and F. Frith, Elbow Hill; J. D. Tolmer and C. Howard, Naracoorte; R. McDonald and F. Proctor, Shannon; O. Olsson, Meadows; G. Kobelt, T. Wilson, and H. Chase, Miltalie; W. B. Randell and R. Hittmann, Gumeracha; S. Robinson and F. Pearce, Whyte-Yarcowie; E. Roeger, Northfield; J. C. Reinke, Narridy; G. B. Littlecraap, Coomooroo; T. Price, R. Langley and, P. Low, Tatara; R. L. C. Sinclair, Green Patch; T. Hill, Butler; J. D. Lovegrove, Meningie; M. Hayes and D. Bowman, jun., Wilkawatt; F. Byerlee, Carrieton.

THE WHEAT MARKET.

There was a steady decline in local values throughout October, wheat which would bring 3s. 9d. per bushel on trucks during the first week of the month being worth only 3s. 6d. four weeks later. The price was dominated entirely by the London market, which was influenced by well-supplied markets in Europe, large stocks at Russian ports, and promising conditions in the Argentine. At the end of September Buenos Ayres reported that climatic conditions had been favorable, with good general rains, which had greatly benefited the wheat. On October 7th, 1910, *Beerbohm's Evening Corn Trade List* described the wheat position as follows:—"With continued large shipments, and increasing stocks at the importing and exporting centres, it is not at all surprising that trade in actual wheat continues slow. The recent large imports on the Continent have resulted in big stocks being formed at Antwerp, and some of the French ports also hold large quantities of wheat. It does not appear at all easy, at least for the time being, to dispose of these accumulations. Whatever may happen later on, consumers cannot shut their eyes to the fact that ample supplies are assured for some time to come, and in all probability they will pursue a very cautious policy until the present superabundance is worked off. As mentioned last week, it is not to be expected that shipments can continue on the enormous scale of the past few weeks; but any improvement in prices would probably find shippers, in most of the exporting countries, quite willing to meet all demands, and this applies especially to Russia and the Danube, where port stocks have been increasing rapidly, notwithstanding the large shipments, and are now very heavy. It is estimated that stocks at the Russian and Danubian ports, at the present time, amount to at least three and a half million quarters, and so far there is no mention made of any decided falling off in the movement of wheat from the interior to the ports. The requirements of importing countries, owing to the very deficient French crop, are unusually large this season; but up to the present there has not been the slightest difficulty in satisfying all requirements, and any material falling off in exports in the near future would not be because the wheat is not available, but because there has been no demand for it, and this is not surprising, considering the very large quantities contracted for, especially on the part of the Continent, earlier in the season. In France the home-grown wheat, according to latest reports, is in much better condition than a few weeks ago, and, considering that even if that country should require 10 million quarters of foreign wheat, native wheat will still supply more than three-fourths of the total consumption, supplies from French farmers are almost certain to increase materially, especially as prices are very attractive. France has already imported, and contracted for, large quantities of foreign wheat, and it is quite possible that further purchases will be made on much more moderate lines until later in the season. The imports into the United Kingdom were very large last week, and stocks at the ports are now estimated to be about 2,650,000qrs., against 2,225,000qrs. last month and 1,975,000qrs. last year. The quantity afloat for the United Kingdom is about one million quarters larger than at this time last year, and for the Continent is also considerably larger. The European and American visible supply increased 4,885,000qrs. in September, against an increase last year of 3,415,000qrs., and is the largest, with one exception (1900), since 1894. So far as the European visible alone is concerned, it is much larger than for many years past. The question of supplies in the distant future will no doubt depend very much on the Argentine and Australian crops, of which it can only be said at present that prospects are fairly favorable, but about two months must elapse before any definite idea can be formed as to the probable yield." A week earlier the same paper stated—"Unless the Russian exports fall off considerably it is very unlikely that the statistical position will be such as to encourage any improvement in prices for some time to come, but any serious mishap to the Argentine and Australian crops would make sellers very reserved."

Date.	LONDON (Previous Day).		ADELAIDE.		MELBOURNE.		SYDNEY.	
	Per Bushel		Per Bushel		Per Bushel		Per Bushel	
Oct. 5	Steady, but quiet ..	3/8½ to 3/9; n.s. 3/8	3/9 to 3/10 ..	3/9 to 3/10 ..	3/9 to 3/9½ b.; 3/10½ s.	3/9 to 3/9½ b.; 3/10½ s.	3/9 to 3/9½ b.; 3/10½ s.	3/9 to 3/9½ b.; 3/10½ s.
6	Firmly held, but inactive ..	Do.	3/10 ex store ..	3/10 ex store ..	3/9½	3/9½	3/9 to 3/9½ b.; 3/10½ s.	3/9 to 3/9½ b.; 3/10½ s.
7	Firm; quiet ..	3/9; n.s. 3/8 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..	3/11	3/11	3/9 to 3/9½ (nom.)	3/9 to 3/9½ (nom.)
8	Firmly held, but inactive ..	Do.	3/10½ to 3/11 ..	3/10½ to 3/11 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
10	—	Do.	3/10 to 3/10½ ..	3/10 to 3/10½ ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
11	4/7½ off coast. ..	3/8; n.s. 3/7 to 3/8	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
12	Dull, and offered lower ..	Do.	3/10 ex store ..	3/10 ex store ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
13	—	3/8 to 3/9; n.s. 3/8 to 3/9	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
14	Steady, but quiet ..	Do.	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
15	Dull and neglected ..	Do.	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
17	—	3/7 to 3/8½ n.s. and o.s.	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
18	Unchanged ..	3/7 to 3/8 n.s. and o.s.	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
19	Dull, with easier tendency ..	Do.	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
20	Do.	Do.	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
21	Do.	3/7 n.s. and o.s.	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
22	Aug., 4/6 ..	Do.	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/9½ to 3/10 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
24	—	Do.	3/9 to 3/9½ ..	3/9 to 3/9½ ..	3/9 to 3/9½ ..	3/9 to 3/9½ ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
25	Dull, and offered lower ..	3/6 to 3/7 o.s. and n.s.	3/9 to 3/9½ ..	3/9 to 3/9½ ..	3/9 to 3/9½ ..	3/9 to 3/9½ ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
26	Dull and neglected ..	Do.	3/8½ ..	3/8½ ..	3/8½ ..	3/8½ ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
27	4/4½ off coast ..	Do.	3/8½ and 3/8 ..	3/8½ and 3/8 ..	3/8½ ..	3/8½ ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
28	Quiet ..	3/6 o.s. and n.s.	3/8½ to 3/8½; 3/8 ex store ..	3/8½ to 3/8½; 3/8 ex store ..	3/7½ h. Do.	3/7½ h. Do.	3/10 to 3/10½ ..	3/10 to 3/10½ ..
29	Dull and neglected ..	Do.	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
31	—	Do.	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
Nov. 1	Very weak ..	Do.	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
2	—	Do.	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/8 to 3/8½ ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
3	Jan., 4/4½ ..	Do.	3/7½ to 3/8 ..	3/7½ to 3/8 ..	3/7½ to 3/8 ..	3/7½ to 3/8 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
4	Jan., 4/4½ ..	Do.	3/7½ to 3/8 ..	3/7½ to 3/8 ..	3/7½ to 3/8 ..	3/7½ to 3/8 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..
5	Dull, and offered lower ..	Do.	3/7½ to 3/8 ..	3/7½ to 3/8 ..	3/7½ to 3/8 ..	3/7½ to 3/8 ..	3/10 to 3/10½ ..	3/10 to 3/10½ ..

STEAMER FREIGHTS.—For parcels for London, Liverpool, or Dunkirk the ruling rate is 20/- per ton (6½d. per bush.). For full cargoes the nominal rate is 25/- per ton (8d. per bush.), prompt loading. For January-February shipments 27/- per ton (8½d. per bush.) is obtainable; Port Adelaide to Melbourne 8/- per ton (2½d. per bush.); to Sydney 10/6 per ton (3½d. per bush.)

SAILER FREIGHTS.—To United Kingdom-Continent, November loading is offered at 24/6 per ton (7½d. per bush.). For new season's wheat a fair amount of tonnage has been chartered at rates ranging between 23/6 and 24/- per ton (7½d. to 7½d. per bush.); with the option of South Africa, 23/- per ton (6½d. per bush.).

EXPERIMENTAL FARM BALANCE-SHEETS.

Last session the Minister of Agriculture promised that the balance-sheets of the different experimental farms should be published in the *Journal of Agriculture*. The attached statements have been submitted by the Acting Principal of the Agricultural College.

ROSEWORTHY AGRICULTURAL COLLEGE FARM.

BALANCE-SHEET, MARCH 31ST, 1910.

<i>Liabilities.</i>		£	s.	d.	£	s.	d.
Capital		—			1,809	13	3
Sundry creditors		—			142	1	3
H.M. Treasury—							
Revenue account		7,282	16	7			
Loan account		7,049	13	0			
Interest account		3,895	18	11			
					18,228	8	6
Profit and loss—							
As on April 1st, 1909		556	12	8			
Profit for year 1909-10		90	11	2			
					647	3	10
					£20,827	6	10
<i>Assets.</i>		£	s.	d.	£	s.	d.
Sundry debtors		—			800	4	4
Live stock—							
Breeding horses		406	0	0			
Working horses		898	0	0			
Cattle		379	7	6			
Pigs		259	19	0			
Sheep		1,080	19	0			
					3,024	5	6
Working plant—							
Implements		931	2	0			
General		308	15	3			
Harness		89	5	10			
					1,389	3	1
Dairy equipment		—			53	14	4
Stores—							
Produce		2,816	5	3			
General		161	8	5			
Manures		48	1	4			
					3,026	15	0
Blacksmith's tools, &c.		—			192	13	8
Land and improvements		—			12,130	9	5
Bare fallows		—			202	1	6
					£20,827	6	10

August 29th, 1910.

W. J. COLEBATCH, Principal.
H. C. PRITCHARD, Secretary.

PROFIT AND LOSS STATEMENT, MARCH 31st, 1910.

Dr.	£	s.	d.	£	s.	d.
1909-10—						
Experimental	556	17	10			
Dairy	163	13	10			
Rent	469	11	0			
Water	113	2	6			
Depreciation on improvements charged to Public Works						
Votes	151	9	9			
				1,454	14	11
Balance—						
April 1st, 1909	556	12	8			
Profit for year 1909-10	90	11	2			
				647	3	10
				£2,101	18	9
Cr.	£	s.	d.	£	s.	d.
Balance, April 1st, 1909				556	12	8
1909-10—						
Wheat	633	15	1			
Hay	586	13	1			
Barley	149	11	0			
Breeding horses	65	1	1			
Sheep	37	7	4			
Poultry	36	15	8			
Oats	33	16	0			
Pigs	2	6	10			
				1,545	6	1
				£2,101	18	9

THE BALANCE-SHEET.

Of the items included under "Liabilities" the Capital and H.M. Treasury accounts were explained in Professor Perkins's covering memorandum last year. An explanation of the figures under "Profit and Loss" is given below.

With regard to the assets it will be noticed that there is a difference of about £130 between the figures for 1909 and this year on account of live stock. This is due to reduced market values. The large increase in the value of produce is attributable to the high returns obtained on the farm last season. The reduction in the case of manures is explained by the fact that this year superphosphates were not supplied until April. The amount placed opposite "Land and improvements" represents merely the cost price of the land plus the expenses of improvements, less the annual depreciations. As most of the land was purchased prior to April, 1899, the assets appear several thousand pounds below their real value, land in this district having doubled in value during the last 10 years. The discrepancy in the case of bare fallows between the 1909 and 1910 returns is due to the lateness of the season, it being found impossible to overtake the work as rapidly last year as in the previous season.

PROFIT AND LOSS STATEMENT.

From this statement it will be seen that losses have been incurred in connection with the experimental work and the dairy. With regard to the

latter I consider the unsatisfactory position is very largely due to the fact that the officer in charge is not resident at the College. An increased amount of experimental work has been undertaken, and consequently additional expenditure has been incurred under this item. The profit for the year 1909-10 is made to appear as £90 11s. 2d., but it should be explained that the gross profit, consisting of the above amount plus the rental charges and the loss incurred on purely experimental work, amounts to £1,115 for the year, so that the real profit, after meeting rental charges, is £646. In this connection I would point out that the amount carried forward each year as profit in the Profit and Loss Account is increased annually by the difference between the real profit and the amount of loss sustained through experimental operations. Had these losses for the past four years been omitted from the profit and loss statements the balance to carry forward this year would be further increased to the extent of £2,224 12s. 6d.



MURRAY BRIDGE.

RAINFALL TABLE.

The following table shows the rainfall for October, 1910, at the undermentioned stations, also the average total rainfall for the first ten months in the year, and the total for the first ten months of 1910 and 1909 respectively:—

Station.	For Oct., 1910.	Av'ge. to end Oct.	To end Oct., 1910.	To end Oct., 1909.	Station.	For Oct., 1910.	Av'ge. to end Oct.	To end Oct., 1910.	To end Oct., 1909.
Adelaide	1.80	18.51	22.06	24.03	Hamley Bridge	1.99	14.58	19.44	18.78
Hawker	0.21	10.25	16.03	13.20	Kapunda	2.01	17.75	21.25	22.51
Cradock	0.61	9.33	13.68	11.31	Freeling	2.51	15.93	21.10	19.81
Wilson	0.48	10.06	16.42	11.88	Stockwell ...	2.48	18.23	20.26	21.24
Gordon	0.76	7.60	10.81	11.13	Nuriootpa ...	2.50	19.08	22.12	24.46
Quorn	1.41	12.01	17.61	13.98	Angaston ...	3.34	19.44	25.66	25.44
Port Augusta..	0.64	7.95	16.44	11.54	Tanunda ...	2.51	19.81	25.78	26.35
Port Germein ..	0.38	10.76	18.96	13.97	Lyndoch	3.16	20.62	24.45	24.88
Port Pirie ...	1.39	11.32	23.88	12.80	Mallala	2.03	14.95	19.46	19.84
Crystal Brook ..	1.71	13.41	20.91	17.24	Roseworthy ..	2.57	15.53	21.02	20.18
Pt. Broughton ..	2.47	12.69	19.60	15.32	Gawler	2.10	17.29	21.80	23.23
Bute	1.82	13.72	22.88	16.25	Smithfield ...	2.13	14.55	21.51	19.95
Hammond ...	0.75	9.34	17.69	13.22	Two Wells ...	1.68	15.94	18.44	17.92
Bruce	0.86	7.67	16.60	10.17	Virginia	2.12	15.71	22.37	20.74
Wilmington ...	1.55	15.76	23.41	19.05	Salisbury	1.97	16.55	22.07	21.59
Melrose	1.56	20.58	29.62	27.02	Teatree Gully ..	2.45	21.81	28.15	34.33
Booleroo Cntr ..	0.98	13.88	20.17	16.16	Magill	2.37	22.78	24.45	33.42
Wirrabara ...	1.31	16.56	25.45	22.67	Mitcham	1.81	23.83	23.02	28.09
Appila	1.45	12.77	24.14	15.78	Crafer's	4.80	42.74	48.80	61.23
Laura	1.67	15.67	27.54	22.10	Clarendon ...	3.74	35.96	31.96	39.46
Caltowie	1.61	14.95	21.28	17.07	Morphett Vale ..	2.47	21.11	23.81	28.36
Jamestown ...	1.73	14.94	22.51	18.26	Noarlunga ...	2.48	18.30	22.49	25.25
Gladstone ...	1.53	13.86	19.04	15.60	Willunga ...	2.79	23.76	29.92	33.16
Georgetown ...	2.52	16.09	24.82	17.02	Aldinga ...	2.66	18.17	23.08	26.72
Narridy	1.71	15.00	19.39	15.18	Normanville ..	2.69	18.82	25.85	23.81
Redhill	2.32	14.60	25.51	18.77	Yankalilla ...	2.91	19.92	34.32	26.20
Koolunga ...	2.20	13.71	23.74	17.59	Eudunda ...	2.14	14.94	27.79	15.55
Carrieton ...	0.61	10.14	18.78	13.44	Sutherland's ...	1.05		15.00	10.87
Eurelia	0.80	11.24	18.38	12.98	Truro	2.58	17.39	23.85	22.96
Johnsburg ...	0.85	8.24	15.02	11.03	Palmer	2.39		19.47	16.43
Orroroo ...	1.05	11.64	17.86	13.19	Mt. Pleasant ...	3.95	24.66	28.69	29.23
Black Rock ...	1.17	10.19	18.88	13.52	Blumberg ...	3.86	27.12	29.68	32.53
Petersburg ...	0.94	11.00	16.67	12.45	Gumeracha ...	5.12	30.18	34.25	41.96
Yongala	1.07	11.75	17.18	13.44	Lobethal ...	3.59	32.96	33.20	43.01
Terowie ...	1.04	11.47	20.05	12.71	Woodside ...	3.73	28.71	34.09	41.56
Yarcowie ...	0.84	11.74	20.45	14.72	Hahndorf ...	4.03	32.53	46.61	40.15
Hallett	1.75	14.33	19.83	14.00	Nairne	3.02	26.32	31.19	34.68
Mount Bryan ..	1.77	13.95	20.48	14.40	Mt. Barker ...	3.12	28.44	31.16	36.26
Burra	2.04	15.93	23.29	17.59	Echunga ...	3.53	20.86	35.90	42.99
Snowtown ...	1.60	13.93	20.45	17.64	Macclesfield ..	4.99	27.72	35.95	34.29
Brinkworth ...	2.21	13.06	22.40	15.94	Meadows ...	4.01	32.28	40.30	43.07
Blyth	1.97	14.34	20.02	20.62	Strathalbyn ...	2.65	17.18	24.56	26.41
Clare	2.42	21.93	28.78	27.30	Callington ...	1.90	14.15	17.61	18.59
Mintaro Cntrl ..	2.57	19.99	36.61	24.31	Langhorne's B ..	2.13	13.62	22.73	15.60
Water vale ...	3.05	24.70	28.05	30.27	Milang	3.12	15.05	15.20	17.05
Auburn	2.71	21.71	29.76	32.29	Walleroo ...	1.75	12.45	18.48	16.89
Manoora ...	2.15	16.40	26.40	19.45	Kadina	1.58	14.46	18.32	18.58
Hoyleton ...	3.12	16.32	19.53	18.76	Moonta ...	1.76	12.71	15.62	19.18
Balaklava ...	2.27	14.19	19.60	17.01	Green's Plns ...	1.82	14.32	18.45	18.92
Pt. Wakefield ..	2.04	11.67	16.25	14.14	Maitland ...	2.29	18.29	20.35	23.70
Saddleworth ...	2.24	17.85	21.05	20.76	Ardrossan ...	1.51	12.54	15.83	16.05
Marrabel ...	2.20	16.07	20.91	24.05	Port Victoria ..	1.56	13.69	16.19	16.75
Riverton ...	2.33	18.42	25.26	23.73	Curramulka ...	2.84	17.24	21.93	20.70
Tarlee	1.73	15.52	19.13	19.56	Minlaton ...	2.01	16.04	20.15	18.98
Stockport ...	1.63	14.36	16.28	10.96	Stansbury ...	1.34	15.51	19.46	20.73

RAINFALL TABLE *continued*

Station.	For Oct., 1910.	Av'ge. to end Oct.	To end Oct., 1910.	To end Oct., 1909.	Station.	For Oct., 1910.	Av'ge. to end Oct.	To end Oct., 1910.	To end Oct., 1909.
Warooka....	1.98	15.37	21.51	16.85	Bordertown .	1.58	17.58	18.06	20.83
Yorktown .	1.79	16.15	20.65	16.87	Wolseley....	1.73	15.70	19.74	21.46
Edithburgh..	2.00	15.00	21.22	15.84	Frances.....	2.12	18.09	21.52	23.01
Fowler's Bay.	1.27	11.26	10.57	13.01	Naracoorte .	2.15	19.95	24.65	24.75
Streaky Bay.	1.34	14.20	16.29	17.45	Lucindale...	2.36	20.62	26.92	26.86
Port Elliot..	2.22	15.05	19.41	17.50	Penola	1.71	23.85	27.89	28.07
Port Lincoln.	2.18	18.54	22.20	17.46	Millicent	3.10	26.29	33.96	36.66
Cowell	1.12	10.64	12.14	9.43	Mt. Gambier.	3.08	28.09	37.94	38.03
Queenscliffe .	—	16.86	—	17.70	Wellington ..	2.15	13.30	17.19	18.77
Port Elliot ..	2.12	18.71	21.21	18.52	Murray Bridge	1.96	12.40	19.74	18.64
Goolwa	2.43	15.96	21.70	22.33	Mannum ...	1.53	10.43	16.53	13.04
Menangle.....	2.07	17.09	19.03	22.99	Morgan	0.55	7.62	12.35	7.83
Kingston....	2.50	22.09	27.12	28.48	Overland Crnr	1.10	9.46	10.74	8.92
Robe	2.47	22.59	29.02	28.46	Renmark....	0.71	9.14	13.91	10.18
Beachport....	2.12	24.69	37.53	36.01	Lameroo ...	1.76	—	17.29	16.65
Coonalpyn ..	1.65	15.67	15.41	21.50					

DAIRY AND FARM PRODUCE MARKETS.

The Manager of the Produce Export Department reports on November 4th

BUTTER.

The excellent quality of the butter is still maintained, and the increased supply is still in evidence. There is a very great demand for butter both locally and overseas. The present prices are—Superfine, 10½d.; pure creamery, 9½d. per pound.

EGGS.

The month of October opened at 7½d., with large supplies coming forward. The inter-State and local demand was good, and large quantities were transferred to pickle tubs and cold store. The weather kept cool, and eggs came to hand in good condition. The month closed with rates at 7½d. for ordinary market lines and 8d. for circle graded.

Messrs. A. W. Sandford & Co. report on October 31st:—

FLOUR.—City brands, £9 5s.; country, £9 per ton of 2,000lbs.

BRAN.—11½d. to 1s.

POLLARD.—11½d. to 1s. per bushel of 20lbs.

OATS.—Local Algerians, 2s. per bushel of 40lbs.

BARLEY.—Cape, seed, 2s. 4d. to 2s. 6d. per bushel of 50lbs.

CHAFF.—£3 5s. f.o.b. Port Adelaide per ton of 2,240lbs.

POTATOES.—Gambiers, nominal, £8; new locals, £12 to £14 on trucks, Adelaide or Port, per ton of 2,240lbs.

ONIONS.—Gambiers, nominal, £7 5s. to £7 10s.; new locals on trucks, £10 to £12, Adelaide or Port, per ton of 2,240lbs.

BUTTER.—Best factory and creamery fresh butter in prints, 9½d. to 10½d.; second grade factories, 9d.; choice separators, dairies, 8d. to 9d.; fair quality, 7½d. to 7¾d.; stores and collectors, 7d. to 7½d. per lb.

CHEESE.—Factory makes, new season's, 4½d. to 5½d. for large to loaf; matured, up to 6d. per lb.

BACON.—Factory cured sides, 8d. to 8½d. per lb.

HAMS.—In calico, 10½d. to 11½d. per lb.

EGGS.—Prime, guaranteed new-laid hen, 7½d. per dozen.

LARD.—Skins, 6½d.; tins or bulk cases, 6d. per lb.

HONEY.—Prime clear extracted, 2½d.; dark and poor flavored, 1d. to 1½d.; beeswax, 1s. 1½d. per lb.

ALMONDS.—(Scarce) Softshells, Brandis, 6½d.; mixed soft shells, 6½d.; kernels, 1s. 3d. per lb.

LIVE POULTRY.—Good table roosters, 4s. to 4s. 6d. each; plump cockerels, 3s. to 3s. 6d.; hens and light cockerels, 2s. to 2s. 9d.; ducks, 2s. 6d. to 3s. 6d.; geese, 4s. to 5s.; pigeons, 9½d.; turkeys, 9d. to 10d. per lb., live weight, for fair to good table sorts.

AGRICULTURAL BUREAU CONGRESS.

TWENTY-SECOND GATHERING.

(Continued from page 307, October Issue.)

Wednesday, September 14th.

FREE PARLIAMENT.

The morning session was presided over by the Chairman of the Advisory Board of Agriculture (Mr. J. W. Sandford).

The Chairman—"The Tatiara Branch has the question of free passes to the Annual Congress being discontinued in favor of passes to country conferences. We want a definite resolution."

Mr. Saxon (Tatiara)—"This was brought forward about two months ago by members of our Branch to ask Congress to do away with free passes to the Adelaide gathering, and instead to provide them to conferences in country districts. We think special facilities should be given to conferences for the discussion by members in one certain district of the affairs pertaining to that district. What would be of interest to Northern delegates at this Congress would not probably be of any use to members from the South-East; and special facilities should be given, we think, to the gathering in particular localities for the discussion of local conditions. I am going to speak candidly. I for one do not believe in this. My position is that if you are going to do anything towards granting free passes to country conferences you should have them for both; the Annual Congress as well. I hope this matter will be given full discussion. It must not be forgotten that country conferences are of as much importance locally as are these annual meetings. I therefore move that this Congress ask for free passes to country conferences as well as to the city Congress."

Mr. Scott (Meningie)—"I second that. It is a very good idea."

Mr. Ricks—"I certainly intend to vote against the motion. It might jeopardise our passes to this Congress."

Mr. Lecky (Davenport)—"Conferences in country districts are among the wisest things established. Thus delegates, say in the Northern Areas, can discuss matters which need not be brought here to waste the time of those who cannot be interested. For instance, the question of the best grain for the soil of the North would be of no use to those from the South. They are purely local matters, of local importance. I would like to see Congress instead of occupying time over such minor matters as this having the opportunity of hearing the professors on important matters such as we

have had a little of, and then for us to confine ourselves to asking questions instead of making long-winded speeches wide of the subject in many cases. I support the motion for free passes both to country and city."

The Chairman—"If it is not out of order I would, in the best interests of all concerned, strongly oppose any interference with the Annual General Congress. Adelaide at show time is the best place where members from all over the State could be got together. I would not object to each of the districts securing passes to their conferences, though. They are of much importance."

The motion was carried with three dissentients.

DEEP CULTIVATION.

Mr. Ramsay (Utera Plains)—"I have often brought forward the subject of the benefit of deep cultivation at our Branch, and have always met with defeat. People seem to run away with the idea that there is too much work attached to deep cultivation. But in lots of instances you could not plough deep. Last year I tried myself and ploughed 12in., and this year it is under crop. I sowed oats, and the growth is double what I planted after ploughing 3in. deep. I consider that the double-furrow plough did not pull as heavy in the 12in. as the five-furrow plough over the 3in. It is a sandy soil, which bakes hard sometimes. The two kinds of ploughing were done under as nearly as possible equal conditions. In sowing I went straight from the one paddock to the other."

Mr. D. Lithgow (Redhill)—"I have had some experience of dry farming. We arranged in our Branch for each member to do 10 acres; but only a few carried it out. I was one who did it, but without carrying out every detail of the system. I did not have the sub-packing, for instance. I had a skim plough with eight horses and turned down the weeds fine. Six weeks after I had eight horses on a three-furrow plough. I ploughed about 6in. deep. Unfortunately there was a clay patch in the middle of the paddock, and I turned up what is called "hungry" clay in our district. On that there was not much wheat. But on the other loamy parts the wheat is very much better, and we had a few extra bags on the 10 acres compared with the other parts. On the other it was eight bags to the acre. Last year was very wet. Had it been finer the difference would have been still greater. The land after ploughing 6in. was harrowed down and worked crosswise while doing the other land."

Mr. Daly (Clare)—"It is difficult to attempt to plough under any general principle. A man has to experiment for himself as to the depth, for it depends on the quality and nature of the soil. I have only 52 acres, but in places I could go over a foot down, while in other places I dare not go more than 3in. or 4in. without turning up clay."

Mr. Fisher (Strathalbyn)—“I have had experience with all kinds of soils, and this subject has to be handled according to locality. In mallee country you ought not to plough deep. You generally turn up clay or limestone rubble. Wherever you come upon a clay patch your wheat will never come to anything like a good crop. I have found almost all scrub farmers recommend shallow ploughing.”

Mr. Lock (Keith)—“Sometimes we want to go too much into detail with our discussions. We practical men don't want to hear that it is wise or unwise to plough into clay. We want to know which is better—deep working or shallow. I am not going to plough for clay or rubble, but am going to decide for myself what depth is best for my own soil. We know how great a mistake it is to plough up hungry clay. Personally I favor deep ploughing where you can do it.”

Mr. Robinson (Balaklava)—“The whole question resolves itself into whether the extra labor is going to be compensated for. We are all after the almighty dollar; and it is not a question of saying whether by ploughing 12in. there will be a better crop than a 6in. ploughing, but whether we are going to be compensated for the extra expense. In this dry climate we can conserve moisture better in 12in. than in 3in. of soil. The Campbell system has proved conclusively that deep ploughing is best. The most sensible way here is to plough according to your soil—not to scratch it, but go 6in. to 8in. deep if the soil is of a nature that this can be done safely. I know a man in my district who ploughs a foot deep and who brought up the subsoil, and his paddock has never since been any good. At the present price of horseflesh I do not advocate 12in.”

A Delegate—“In dry districts it is not a question of expense, it is no crop or a good crop. If you get down 12in. you have the moisture. As a hills fruitgrower I can say that we plough fairly deep, taking care not to turn up the sour soil. We have found our crops doubled by going down to the bottom of the good soil. You do not have to do this every year. Once sweetens the soil for a long time. It would pay the farmer to each year turn up a few acres deeply, but not the sour soil.”

Another Delegate—“We are wasting time. As Mr. Colebatch told us, it is all a question of our own judgment.”

Mr. Summers—“It is all very well to say the farmer knows best. I admit he ought to best find out for himself. I suggest you should read the report of experiments by Mr. Treloar, of Redhill, who held somewhat the same views as expressed here. But unlike some of us in our discussions he decided to try it for himself. He ploughed 10 acres deep and 10 acres shallow, and kept account of the cost and the results. Our defect is that we do not carry matters of this character to a practical test. The results, according to Mr. Treloar, do not pay him for the first year's operations, but it is most probable he will see the benefit for several years.”

Mr. Stevenson—"I cultivated 100 acres a few years ago ploughed lightly, and another patch to a good depth. The following harvest there was little difference. But last year where the deep ploughing had been there was a difference of fully half a ton to the acre in hay. I know that deep ploughing is beneficial if it is occasionally indulged in over a farm."

Mr. McCormack (Bute)—"The trouble is that many farmers start these experiments and have nothing definite to tell about them. Their work is not conclusive. I come from a shallow ploughing district. I am almost ashamed to tell you how shallow we plough."

The Chairman—"Write it down."

Mr. McCormack—"Well, it is about 3 in., and no district in the State gets a bigger percentage of returns than our mallee country. Something more tangible should have been put before us than was the case in starting this discussion."

Mr. Colebatch—"I must sound a note of warning to the suggestion that you should start to carry out experiments. It is not the slightest use expecting to get reliable results unless you continue your work over 10 or 12 years; results of one or two years' experiments are not sufficiently reliable for discussion. The college is starting experimental work this year along certain lines, and if they can be duplicated in other places so much the better. There is a good deal in what has been said that deep ploughing must be done at intervals and not continuously."

A Delegate—"If your subsoil is poor it is no good bringing that up. You only spoil your work. There are so many different kinds of soil, and it takes years to find out their proper treatment by experiment. We ought to make them with the greatest care."

MANURING EXPERIMENTS.

Mr. Smith (Angaston) moved—"That the Government be asked to undertake experiments in the manuring of orchards and vineyards in different parts of the State." He said—"I do not ask that these experiments should be carried on in one district only. The weakness in the past has been that experiments have been carried on in one district alone. We realise that the farmer is a very fortunate man. He can put in his crop and reap in the same year. He can put in his manure and realise from it almost at once; but the fruitgrower has to plant an expensive crop and then wait for several years, and then he may find out that his trees are dufters or on the wrong soils. Then he may have to supply soil deficiencies, and he tries manures; but he is working in the dark, and he is perhaps taking years to find out that his work is useless. We are asking for this resolution on behalf of the present generation and the next as well. I want my sons to be able to go back 20 years and be able to put their fingers on the record of some manuring experi-

ment and see whether it has been proved over long experience. It may save much trouble and costly mistakes for the future. We wish these experiments to be carried out by Mr. Quinn and his staff."

Mr. Player (Angaston)—"I second the resolution. I do not think we are asking the Government too much. Other interests are assisted while we are working in the dark. We are closely settled. Some of us are making livings on eight acres. We spend money on manures to try and find out what is best suited, and after years of work we find we have not solved the mystery, and each of us is working without combination or system in trying for better conditions."

Mr. Mitchell (Lyndoch)—"I am pleased that this has been moved. The Government has helped the gardener over the alleged cures for orchard diseases; and we ask again for help, for we have nothing to go upon in the way of manures. Our experimental plot at Lyndoch is itself a step in the right direction."

Mr. Bray (Gawler River)—"As a practical fruitgrower I support this motion. Ours is a growing industry which is going to become still greater in our future history. We are only asking for our rights."

Mr. Pitt (Renmark)—"In our experience the experimental work in orchard manuring is too costly for the individual. The Government should establish not only experiments with manures, but should also test the soils in the various districts as to the best fruits to be grown there. It is no joke when you find that the land you have trees on is best fitted for vines. If the Government took up a little land in various spots the products grown on them would go a long way to pay for their cost, and they would be of the greatest benefit to the whole State."

The motion was carried unanimously.

ROSEWORTHY COLLEGE.

The Acting Principal (Mr. W. J. Colebatch) reintroduced the subject of Roseworthy College. He said—"I am willing to repeat all that has been said with regard to farmers not supporting the institution. I do not wish to hit below the belt, but am going to get in a rap above that line, because it is deserved, and I would not be doing my duty otherwise. I am going to give a few details that will surprise you. A classification of the students at present attending shows that there are three sons of ministers of religion, two of solicitors, three of engineers, and one or two of practically every trade and profession going; but on top of all that variety only two sons of farmers."

Voices—"Shame." "No shame about it."

Mr. Colebatch—"That is not a fair position. I know farmers can ill spare their sons; but are there only two farmers in the State sufficiently prosperous to be able to afford their sons such an education? If the training is no good,

why do you find practical farmers, who have already received their education at the college, going back there for the best men they can get to manage their farms for them ? " (Applause.)

Mr. J. W. Dall (Northfield)—" We all recognise the usefulness of the institution ; but I feel inclined to vindicate the farmers. The difficulty is that their sons have already been trained to horse-driving, and are not likely to be improved in that respect by being sent to college. It would be so much time lost. There should be more provision for scientific lessons and less of this useless practical work."

Mr. Hughes (Woodside)—" Farmers' sons are not being sent to the institution for more reasons than one. A few years ago there were more farmers' sons there than at present. Youths are turned out who would have learned more on their fathers' farms in the same time, and what technical knowledge they had could have been learned in a three months' course at the School of Mines. Not only that : the discipline at one time was not what it might have been. Personally, I have recommended people to send their sons to the place, and I have a high opinion of Professor Perkins ; but I do not advise sending farmers' sons—only the sons of men who could not teach the boys anything about farming."

Mr. Robinson (Balaklava)—" I have been itching to get on my feet. As an old student I want to speak of the shabby way farmers are treating the institution."

Voices—" No ; not shabby."

Mr. Robinson—" I know of men who have learned enough to become successful farmers there ; and Mr. Colebatch is a sample of what the school has turned out. Why should you cast a slur on the whole institution because one or two students had got out of hand ? For the college to be damned because of that is unmerited. I know the discipline is good. In Professor Perkins we have a giant for experimental work, and he is doing it all for the farmers."

Mr. Lock (Keith)—" We are taking the matter too much to heart. If my son wants to learn to become a farmer I can teach him myself. The college is a grand place to send boys whose parents know nothing about the business."

Mr. Billinghamurst (Crystal Brook)—" The institution's objective is wrong. It is too much experimental. The discipline, too, is not what it should be. The boys are not kept in strict order."

Mr. Colebatch—" That is rubbish."

Mr. Billinghamurst—" There should be a little of what they had in Scotland—the rod—even for boys 19 years old."

Mr. Stevenson—" Mr. Colebatch has based his figures in such a way that we cannot get a clear idea of them. They are for just the present period. In Professor Lowrie's time he had more farmers' boys."

Mr. Colebatch—" No ; he had the same trouble as I have had."

Mr. Stevenson—"In recent years labor has been so dear. That is the trouble. I have had such a difficulty with labor that I am bound to keep my boys home instead of sending them to college. Personally I am delighted with the good work of the college. But I would like to know if you start a farmer's son there in the same class, say, as a parson's son, irrespective of what they know and do not know about farm life."

Mr. Sears (Forster)—"I have seen only the best discipline at the college. It is a splendid institution. As to that slight outbreak, where can you get perfect discipline among a lot of young fellows. They are not children."

Mr. Saxon—"I congratulate Mr. Colebatch on bringing the subject before us. I know of two students who were at the college when that incident occurred, and they are now two of the most practical farmers in our district. The college has my sympathy, and I trust Mr. Colebatch will have one of my sons under his control."

Mr. Colebatch (in reply)—"The subject is not new. In Professor Lowrie's time it was the same. Two farmers' sons out of 50 students is far too small. As to more scientific work and less practical you cannot expect fellows used to the open air to spend their days inside over books without any practical work. Besides, the experimental work is for their own parents' and their own future good. If I am going to be asked to birch youths of 19 and 20 then I am going to resign. I take exception to the statements that discipline is not good. These students are young men having a serious purpose. They are ruled on their honor."

Voices—"Hear, hear; that is the right way."

Mr. Colebatch—"If they cannot keep to their given word there is always a train to take them back to town, and they know it. I hope farmers will give the institution much more support in the future."

WEIGHT OF MANURE BAGS.

The Clarendon representatives introduced the subject of manure being put up in 1cwt. bags. The mover said—"It has been the opinion of most of our members that, under the present condition of labor, manure should be put up in smaller bags. If you have to lift 2cwts. on to a dray you must get assistance. I move that it is desirable to recommend manufacturers to put up manures in bags of not more than 1cwt."

Mr. Harper—"I second that. I have always found a 1cwt. bag a good deal handier than a 2cwts. bag. The smaller bag means a saving of time."

A Delegate—"The manure bags are only 1½cwts. or a little over."

Mr. Dall (Northfield)—"Anyone who wants a 1cwt. bag now can get it put up in that way by paying half a crown extra."

The motion was lost with only three votes in favor.

EXAMINATION OF WHEATBUYERS' SCALES.

Mr. Lock (Whyte-Yarcowie)—“I move that we recommend the appointment of inspectors of wheatbuyers' scales. The subject has been discussed in our branch. Probably most farmers here have experienced dissatisfaction in this respect. I understand that under the Weights and Measures Acts the scales can be inspected by district council officials; but many of the district councils are pretty good at not carrying out their duties, especially if this sort of thing means any trouble. Many people have come near to suffering big loss from wrong scales. I am not going to say there are any agents who will deliberately defraud a farmer, but they can do so, and the temptation is on them.”

Mr. Lithgow (Redhill)—“I second the motion. The subject has been before our branch. I do not say agents are rogues; but mistakes might happen. I have known scales to weigh 6lbs. light at the end of a season.”

Mr. Smith—“What is to prevent a dishonest man putting his scales wrong immediately after they have been tested and passed? Every farmer should have his own carefully kept scales so that he might check the agents' figures. If the buyer is up to any monkey business he will not fight your weights when you show them to him.”

Mr. Sunners—“One or two country Branches have complained direct to the office and asked for something to be done. We brought it under the notice of the Minister and he requested the district councils to do this. It is their duty to carry out the Weights and Measures Act, but they do not do it sufficiently. The fact that scales will balance when the weight is not on is no assurance that they are correct. With our Manures Act we are in just the same position as that put by Mr. Smith. I may go to the depot to-day and find everything satisfactory. This does not say the man cannot alter things the next day if he is determined to defraud the public. The fact, however, that he does not know when I am going to make my inspection and I have the power to prosecute is the safeguard. Anyone who is carrying out a fraud with scales deserves to fall in; and no wheatbuyer would run the risk if there were surprise visits by responsible people with standard weights. The whole thing is that the district councils should carry out the law.”

Mr. Saxon—“Pretty nearly every town would need to have an inspector on the spot continually, and all the time chasing the agent up; for if you carry a pair of scales from one place to another it may need to be adjusted. I always know the weight of my bags and can challenge the agent if he is not weighing correctly. Each man has to be careful for himself. I had a recent law suit over weighing. After about 50 bags had gone past I challenged the weighing; but the agent said, ‘How are you going to pick out your bags and test them again? You cannot tell which they are.’ So you see it is a question entirely for individual care and protection.”

Mr. Holdsworth (Port Augusta)—“At Port Augusta we received notice from the Commissioner of Crown Lands in respect to this matter. As clerk of the council it is my province to personally test the scales, which I do. You farmers ought everywhere to insist on your council's enforcing this Act, for the fact that a scale apparently balances is no safeguard.”

The motion was carried.

Mr. Saxon—“I take it that that vote means that district councils are to be asked to enforce the Act.”

The Chairman—“That is so.”

PERCHERON HORSES.

Mr. Lecky (Davenport)—“I move that we recommend the Government to introduce Percheron horses into this State. The Government has purchased various types of blood stock for the good of the producer. Some time ago we requested that the Government should purchase a Percheron stallion and a couple of mares for experiments. We were told the Ministry could not see a reason for doing so. But we bring it forward again, because it may do much for farmers' stock. The Clydesdale and Suffolk Punch are useful horses, but they are heavily feather-legged to protect them in a cold climate, and we do not want that here. The Percheron comes from France and is very compact. It has sound feet, which does not always follow with the Suffolk. They have splendid legs and are good and active workers. They would make an ideal horse for South Australia. The introduction of the Percheron in America has knocked all other types sky high.”

Mr. Nairn (Stockport)—“We are going to the Government for everything. A farmer ought to have brains enough to get the sort of horse he wants. I oppose the motion.”

The motion was lost by 16 votes to 26.

EVENING SESSION.

Mr. Sandford again presided.

SELECTION OF WHEAT.

INTRODUCTION.

Mr. A. E. V. Richardson, B.A., B.Sc., gave an address on “The Value of Seed Wheat Selection.” He said—“The selection of wheat is a topic, which, as far as I am aware, has not yet been discussed at our annual Congresses, and its great importance in this age of progress is a sufficient justification for introducing it this evening. We are well aware that the past season has been a record one for South Australia, and that the wheat yield has reached high-water mark in the history of this State, and that 25,000,000 bush. of golden

grain have been gathered in. We must not imagine that the limit is reached. Further advance is not only possible, but inevitable, simply because in South Australia there is room for very great improvement in two directions. First, in the acreage under cultivation, and, what is more important, a better criterion of true agricultural progress, an increased efficiency in each acre under cultivation. An increase in the area under cultivation will follow naturally with increasing land values, the adoption of a vigorous policy of settlement, and with increasing facilities for placing new settlers on the newly-opened areas. But an increase in the efficiency of each acre will be brought about by further improvements in the system of cultivation, by a rational scheme of fertilisation, and by an improvement in the varieties of wheat-growing throughout the State. No one can deny that there is need for increased efficiency in South Australian agriculture, for during the last decade our average wheat yield per acre has been lower than any other country in the world. We have witnessed an extraordinary revival of interest in agriculture in South Australia during recent years, and this has largely been attributed to the introduction of super. and better methods of cultivation. Another revival is before us. Further improvement, I venture to affirm, will come—not by improving the chemical composition of the soil by manures, not by improving the plant's environment by cultivation, but by an improvement in the plant itself; and selection of seed will play no small part in bringing such improvement about.

MEANING OF SELECTION.

“(1) By selection of wheat is often meant merely taking pains to have nice, clean seed wheat free from cracked, pinched, and inferior grains. It means to some farmers simply some process of grading or cleaning ordinary f.a.q. wheat. Just here it might be mentioned that there are many farmers who firmly believe that shrivelled, puny grain gives just as good a yield and as strong a plant as fine, plump grain. Wherever this point has been systematically tested the verdict has always been unanimous in favor of plump grain. It is very necessary to remember that pinched and cracked grains have practically no agricultural value when applied to the soil, inasmuch as they will not germinate satisfactorily. But pinched and cracked grains have a commercial value as pig and fowl feed. Hence it is good business to remove from our sample of seed that which is of no agricultural value, but which is of considerable commercial value. And herein lies an argument for the grader in the preparation of seed wheat. (2) By selection of wheat we frequently mean the selection of that particular variety of wheat which is most suited to the particular district in which the individual lives. It may be well to pause just here and consider the question more fully. The difference of yield between two varieties of wheat grown on precisely similar soil, under similar conditions, is frequently sufficient to pay for the interest

and rent of the land on which the crop is grown. This has been proved time and again in departmental experiments, and it was illustrated in a remarkable manner at Parafield last season. Marshall's No. 3 and Federation were sown alongside one another on precisely similar soil, and whilst they had exactly the same soil and climatic conditions there was a difference of 16bush. per acre in favor of Federation, which is equivalent to £3 4s. per acre. The question as to what variety to sow is an extremely important one, but you can only determine by experiment just what varieties are best suited to any particular district. (3) But the selection of seed of which I wish to speak to you to-night is a process which has for its object an improvement in the existing types of wheat, a process of reaping increased returns solely through the special propagation of selected plants.

POSSIBILITIES.

"One may be inclined to ask—Is it possible to achieve such a result? Is it possible by any form of selection to raise strains of wheat which are more prolific than those we grow? Researches in American agricultural colleges and experimental stations have proved time and again that the average yield of given varieties of wheat, barley, oats, and maize can be increased from 20 per cent. to 25 per cent. by a process of rational selection. At Roseworthy College it has been shown that King's Early, which in 1904 had degenerated considerably from the original type, was restored to its position as premier wheat of the farm by three years of systematic selection. It is now universally admitted as a result of careful experiments throughout the agricultural experimental stations of the world that great improvements in the yield results from intelligent and rational selection. And assuming that a simple, effectual, and practical process of selection could be adopted by every farmer in the State, and that by such selection an increase from 15 per cent. to 20 per cent. in the yield may be expected—a very conservative estimate—it would mean to this State, on the basis of last year's figures, four to five extra million bushels, or a cash equivalent of £1,000,000, and this without any expansion of the area under cultivation.

BASIS OF SELECTION.

"It is well, before proceeding further, to ask upon what basis selection rests. All improvement of wheat is based upon the law of variation—that no two plants are absolutely identical; that every plant, even of the same species, has certain characteristics, certain properties, certain attributes, whereby it differs from all other plants of the same species. To the man in the street every individual in a large flock of merino sheep seems like every other individual. He cannot distinguish one from another. But to the shepherd and the enthusiastic stockbreeder every sheep has a certain collection of attributes, certain peculiarities which distinguishes it from every

other member of the herd. That is, each unit possesses what we call individuality. Plants, then, are infinitely variable, and nature is always moulding the individual plant to fit the chinks of environment, and the more the environments vary the more unlike become the individuals.

"What is the cause of this variation? In this question we have touched the most controversial point in modern philosophy. Why these variations should occur seems to be almost an inscrutable question. However, there are one or two facts which throw some little light on the problem. Changing the physical environment always induces variation, and one of the most prolific causes of variation is a change in the food supply. As Darwin says: 'Of all causes which induce variation excess of food is probably the most powerful.' Another powerful factor in inducing variation is the struggle for existence. If all the seeds produced were allowed to germinate there would be far too many plants to reach maturity. A fierce struggle for a chance to live is therefore inevitable. The weaker plants are forced to the wall; the stronger, after a fierce struggle, survive. Darwin says, 'Those plants in the long run survive which are able to best adapt themselves to their environment.' Those individuals, plants or animals, survive which are best fitted, which vary in such a manner as to gain an advantage over their less fortunate neighbors.

FAMOUS WHEAT BREEDERS.

"*History of Selection.*—Selection is no new idea. The advantages of careful selection were known as far back as Roman times. The classical Roman poet, Virgil, saw that by selection it was possible to counteract the tendency of cereals to degenerate (Georgics I., 198-201)—

Unless the peasant with his annual pain,
Renews his choice and selects the largest grain,
Thus all below, whether by Nature's curse,
Or Fate's decree, degenerates still to worse.

"Le Couteur was the first to discover the principle of improving cereals by selection. He lived in the Isle of Jersey. Once he was visited by Professor Le Gasca, of the University of Madrid, who, on examining Le Couteur's wheatfields pointed out quite a number of distinct types of heads. Le Gasca suggested that these different types might have a very different share in the harvest of the whole field, some probably being more reproductive, some less productive, than the average. After his departure Le Couteur saved the ears of the indicated types separately, and sowed their grains in small field plots to compare their productivity. He thus produced 23 distinct types of wheat, some of which were more productive, some less productive, than the average. He weeded out the poor ones, and his best type was the famous Talavera.

"*Patrick Shireff.*—His method of selection was as follows:—He observed that from time to time in his various cereal fields a plant which seemed more promising than all the remainder of the same field. He marked these plants, gave

them every attention, helped their development by pulling out their neighbors if they were too crowded. Then he saved the seeds of these marked plants and multiplied the types as rapidly as possible. Shireff's exceptional plants were very rare, so rare that in the first period of 40 years he succeeded in isolating only four varieties of prominent value. Now, it is interesting to note that neither Shireff nor Le Couteur had any idea of the usefulness or necessity of a repeated selection. They selected only once, and selected only one particular plant because it stood out prominently in advance of its neighbours; in fact, in the history of breeding they seemed to be the only breeders who worked on the one initial selection and of rapid multiplication without renewing the choice in succeeding generations.

"*Hallet*.—Major Hallet, a prominent and noted breeder, started from quite another point of view. His principle was that each plant had one head which is the best of all its ears, and that in the same way each ear has one best kernel. Hence, he concluded that varieties can be improved by choosing the best kernel of the best ear for reproduction. This choice must be repeated through a series of generations, and his experience taught him that though the improvement in yield was very rapid at the beginning, there was a limit beyond which it was impossible to go. The important point to recognise in Hallet's work is that he emphasized the necessity of continuous selection—selection of the best from the best for a series of generations—and this he described as pedigree wheat. Moreover, he went to no end of trouble to find out which kernel was the best of the head. Every plant was minutely examined, the number of heads counted, and the number of grains in each head. His method, then, was the choice of the one best kernel in the best head of the plant. Compared with Shireff and Le Couteur, we can see that the two essential points are—(1) Selection of suitable parent plants; (2) slow and gradual improvement by continual selection.

"*Svalof*.—Of late years a seed wheat company of Svalof, Sweden, has thrown a great deal of light on the question of wheat improvement by selection. This company started in a small way in 1886 and concerned itself with the introduction of new and valuable varieties of seed from foreign countries. Its operations gradually extended until the Swedish Government, recognising its value, subsidised it. It is now one of the largest and strongest of Swedish agricultural societies, and does a most useful work in the distribution of pure, clean seed. Since the advent of Dr. Nilsson as Director of the organisation, it has done a great work for the amelioration of varieties of seeds. So far as the methods of selection are concerned, they are of interest rather to the scientist than to the practical farmer. All we need to say is that their selection begins from one single head.

"*Hayes*.—Wm. Hayes, of Minnesota has introduced a very remarkable principle to improve varieties of wheat. His method is to judge the value of any plant by the average value of its progeny. It does not necessarily follow

that because a plant has fine, large, well-developed ears, that these will be reproduced in the progeny. He judges the value of a plant, *not* by its visible characteristics, but by its hereditary qualities—by the productive power of its offspring; hence Hayes plants 100 grains of each of his selected plants, and judges their respective values by a comparison of the yields from 100 grains. He has worked on Fife and Bluestem—the two most widely cultivated varieties in Minnesota—and claims to have raised the yield of his crop from 15 per cent. to 20 per cent. over the yield of ordinary Fife and Bluestem.

METHOD FOR FARMERS.

“Having discussed various methods of selection adopted by different breeders let us try and formulate a scheme which will be suited for the requirements of arable farms of this State. Any scheme which might be suggested must be one which will involve as little hand labor, and take as little time as possible. It must, too, be effective—be continuous and uninterrupted—that is, each individual farmer must be prepared to continue the work year after year, otherwise he cannot hope to keep up the standard of excellence or prevent degeneration of his produce. It is based on the same kind of faith as that which inspires the breeder of pedigree stock—the faith that gradual improvement takes place, and perfection of type is reached by the selection of the very best animals year after year, accompanied by a vigorous exclusion of the culls. What would we think of the stockbreeder who sold his best stock and bred from the culls? However could he expect to gain any prestige as a breeder of pedigree stock? Surely the same principles apply in the vegetable kingdom. And yet, a few years ago it was not uncommon for a farmer to sell his best produce and use inferior grain as seed. Even now the best that some farmers do is to choose for seed some well-grown patch. Selection, in the sense we have used it this evening, is very rarely practised. A very simple and effective manner of accomplishing this object would be as follows, provided the wheat has been fixed and is not a hybrid character:—Go through a field of well-grown wheat of the variety you wish to improve by selection. Strap a broadcasting tin across your back, and go through the field selecting all plants which stand out as superior to their neighbors. Choose sufficient of the best heads of these selected plants to yield on hand-threshing about 10lbs. of clean seed.

“This should not require more than a couple of hours’ work at the outside. The grain you thus obtain represents the best heads of the elite of that crop. Grade this 10lbs. by passing it through a few hand wheat sieves and sow this in one long strip with the drill. Ten pounds should sow one-fifth of an acre. This will represent your ‘stud wheat’ plot—10lbs. of the best grain of the best heads of the best individual plants—the elite of the farm.

“In 1911 go through this one-fifth acre and select 10lbs. of the produce of the very best plants, and after grading, sow it in 1912 as your ‘stud’ plot. Strip the

balance of the one-fifth acre and sow all of it in 1912 for your 'seed' plot, because from this you will have the seed to sow on a larger scale the next season. This five-acre plot should give you enough seed for 100 acres to 125 acres, and this will be your 'bulk' plot where the ordinary f.a.q. wheat will be grown year after year. This is all you want each year—(1) A stud plot of one-fifth acre—10lbs. seed, a matter of a few hours work. (2) A seed plot which will be sown from the balance of the stud plot. (3) A bulk plot which will be sown from the seed plot and which will form the main crop of the farm. Now, this applies only to one variety. If you are sowing two or three varieties in large quantities the same procedure would obtain in each case. With fair land 10lbs. of seed in two generations will sow 100 to 125 acres. Observe that each year the wheat must be better than the previous, because each year the stud plot is a selection of the best from the best. By such means the standard of productiveness will be considerably raised, and the tendency to degeneration—so frequent in all varieties—counteracted. It only needs a few days' work each season to carry out such a simple method, and good profits may be secured without any large outlay.

CONCLUSION.

"In conclusion, a word or two might be said about the peculiarities of our South Australian climate and the special qualities which wheats ought to possess and which we try to attain by a process of selection. The inland agricultural areas are mostly dry, hot, and liable to sudden changes of temperature. These factors do not make for *high yields*, but they make for *good quality* in wheat. If this summer heat be accompanied by moisture the conditions are likely to be exceedingly favorable for the development of rust; hence four qualities should always be kept in mind in selecting wheat for dry regions.—(1) Ability to thrive in dry soils. (2) Habit of stooling sparingly. (3) Early maturity. (4) Resistance to rust.

1. *Ability to Thrive in Dry Soils.*

"Whenever in a dry season the effect of the dryness becomes apparent on the crop by a partial withering of the ears at the tip, or by their meagre growth, it is generally possible to find one or more plants which grow vigorously and which are well filled with plump grain. These plants must possess some qualities which the other plants do not. They showed their superiority because, the environment being similar, they reacted on their environment better than the others. These are the types of plants, which, if bred from, are likely to give better average yields in adverse circumstances.

2. *The Habit of Stooling Sparingly.*

"You will always notice that whenever the soil is dry, while the grain was being formed, varieties of plants which stool largely also fail to fill their

ears properly and contain mostly a shrivelled, pinched grain, while those which stool more sparingly generally yield better grain and more of it. It looks as if the varieties which stool vigorously and produce a large number of stalks for each grain sown have undertaken too much, as if they have expended all their strength in preparing for a big crop, and have failed to produce more than a small amount of grain of inferior quality. In a moist, rainy climate it is seldom that there is a lack of moisture during the critical period of ripening, so that the propensity of stooling is an eminently desirable characteristic. But in most districts of this State you can never be certain that a single set of roots will be able to gather moisture enough to carry through to maturity in a dry season more than a limited number of heads. In our climate, then, we want to increase as much as possible the proportion of root system to stalks, and this can be done by selecting those varieties which stool sparingly rather than very profusely.

3. *Earliness of Ripening.*

"On account of the fact that hot winds are very frequent in early summer, and that frequently long periods of dry weather occur during the ripening season, it is of great importance that the varieties we grow should build up their grain and come as near to ripening as possible before the hot winds set in. Moreover, early maturing varieties are frequently able by virtue of their rapid maturity to some extent at least escape a severe ravage of rust. The advantage of selecting plants which are comparatively immune from attacks of rust are too obvious to require discussion. The wheat improver, therefore, must have his ideal ever clearly before him, and if his lot fall in dry country he is most likely to achieve success by selecting plants which stand out from their neighbors in their general ability to thrive well on dry soils, and which possess the property of early maturity, combined with the ability to withstand rust. We cannot all expect to achieve equally successful results in the matter of selection. The greater profits will come to those who have a taste for the work, and who are willing to give it the necessary attention. The most successful farmer will be the one who combines scientific with practical business, and who is guided in his work of breeding by a very thorough knowledge of the laws of variability. We have seen that there is much need for increased efficiency, and increased efficiency is the surest sign of true agricultural and economic progress. We ought, if not merely for the sake of our pockets, at least for the sake of our national pride, strive to make our soils produce more than they are producing to-day. Our cry should not be 'more land,' but 'better farming'; and when the South Australian farmer grows these varieties of wheat which are best suited to his district, pays the most careful attention to the preparation and grading of the seed, and adopts a rational scheme of selection for improving the yield of those varieties which suit him best, South Australia will have gone

one step further in the evolution of her agricultural destiny, and the South Australian producer will reap a richer reward from his toil than did his predecessor in the past."

Mr. Lithgow (Redhill)—"I happened to grow the two wheats mentioned; and my Marshall's 3 went about 18bush. and Federation about 25bush. to the acre. The crops were apparently equally as good, but there were oats in Marshall's, and that may have been the reason for the difference. The heads broke off badly also in Marshall's. Was that the experience with Mr. Richardson?"

Mr. Richardson—"The conditions were absolutely the same. I quoted those two varieties, not to point out the difference in quality, but to point the experience. In other seasons the conditions may have been reversed."

Mr. Saxon—"Federation is about the leading wheat in the South-East, but we frequently have a great deal of short heads."

Mr. Richardson—"That is a characteristic of Federation."

Mr. Brown (Frances)—"What is the cause of dummy heads in wheat? Down our way there is possibly one in six."

Mr. Richardson—"They may be due to various reasons which can only be examined on the spot. I would be inclined to put it down to climatic conditions."

A Delegate—"Regarding your statement of Professor Perkins's success with King's Early, do you mean that that variety beat Federation as the champion wheat?"

Mr. Richardson—"Federation never seems to have been successful at the college. It may be the soil or the climatic conditions. King's Early seems to be the most profitable in that district."

Mr. Twartz—"I have noticed that at the bottom and top of a head the grains are always very small ones. Would you grade them out? Would there be danger of getting a light grain with them?"

Mr. Richardson—"French graders found that the biggest grains were always in the centre. The greatest vigor also lies in the central grains of the head. We adopted the practice three years ago by selecting the middle of the heads—breaking off the top and bottom and hand-threshing and grading. That selection gave us 38bush. to the acre, eight more than any other on the farm, and 16bush. more than Marshall's No. 3."

Mr. Dunsford—"Marshall's is the wheat most subject to break off. It is a good wheat; but why is that?"

Mr. Richardson—"You can select the plants which show the least capacity to break off, or you can cross-breed. I believe it could be improved by crossing with, say, Huguenot for hay or Federation for grain. By such cross-breeding you may combine the qualities of Marshall's with the strong upright straw of the other varieties.

PREVENTION OF STOCK DISEASE.

The Government Veterinary Surgeon (J. F. McEachran, M.R.C.V.S.) contributed a paper on "Prevention of Disease amongst Live Stock on the Farm." He said—"Notwithstanding the rapid strides made in the growing of cereals and fruit for export I am fain to think the hope of Australian agriculture is still centred in its live stock. The spread of knowledge bearing on the prevention of disease amongst live stock on the farm or station is of very great importance—the preservation of their health is not only to be desired, but to a large extent to be attained. It is an excellent idea at a gathering of representative farmers and stockowners, *e.g.*, to review generally their position in regard to diseases in stock. Of course, I recognise that the danger in considering questions relating to diseases of animals is that local, temporary, or personal matters sometimes have more importance given to them than they really deserve. But the interests of the farmer are so far bound up in his live stock that no system of agricultural education can be complete which does not embrace the study of hygiene—the prevention and suppression of disease. A campaign against disease must be carried through in no half-hearted manner. The live stock in this State represents a very considerable amount of money, and in order to secure it against loss it is necessary that a certain percentage of its value should be invested for its protection. The eradication of stock diseases can only be carried out effectually and economically by an efficient stock department working on sound, commonsense, and scientific lines, and with the zealous co-operation of the stockowners themselves. Any money spent will be repaid with interest, and the fact that a country is free from stock diseases ensures the prosperity of its agricultural industries and makes its stock sought after in the world's markets. Until quite recently live stock in Australia were of low individual value, and their loss from sickness was often looked upon as inevitable and of comparatively little significance; but as the country became more thickly settled more attention has been paid to stock-raising and improving the various breeds, and as new country is opened up and settlement on the land encouraged animals become more valuable, and the existing market price for draught horses is an excellent indication."

HELPLESS OWNERS.

"When an animal plague appears the stockowners begin to realise their helplessness and to look around for means to save their stock. The Stock Department of this State has always been alive to the interests of the stockowners, and the fact that this State is practically immune from the ruinous effects of dangerous diseases reflects to the credit of the officers who have had charge of the department. The annals of the department contain no more brilliant record of effective work than that which relates to the suppression of disease amongst live stock. Sheep scab has been effectually extinguished, and the complete eradication of sheep scab from the flocks

of Australia and New Zealand is a striking object lesson to other parts of the civilised world. The science of bacteriology, which in its earliest stages seemed far removed from any useful purpose, has, as we all know, within the last three decades not only revolutionised our conception of disease, but our medicinal and surgical treatment, and in that way saved innumerable lives. With regard to preventive treatment it is from bacteriology that our ideas and methods have been largely derived. This study is advancing with such rapid strides that it is difficult to keep pace with it. But why should I draw attention to the almost kaleidoscopic change of knowledge? We appear to be immersed in a sea of microscopic life—apparently there are few diseases which are not actually caused or at a later period aggravated by the presence of micro-organisms. It is one of the encouraging signs of the times that the Governments of the various countries are voting sums of money to be expended to prevent or arrest contagious diseases, and their efforts have not only been crowned with success, but a multitude of hitherto unknown or imperfectly recognised sources of infection have been discovered. Diseases, *e.g.*, surra, tsetse fly disease, tick fever, fowl tick, and many others have now been carefully and systematically studied and proved to be caused by minute organisms and disseminated by means of piercing insects and ticks. It is quite evident that in the preventive treatment of disease in the future a careful study, not only of the parasites but of the insect carriers themselves, will be essential. South Africa, India, and the Philippines are particularly rich in diseases affecting domestic animals, and there can be no question that the immunity from these diseases in Australia is owing chiefly to the strict quarantine regulations of the different States, and South Australia in particular. Quarantines are absolutely necessary; but they must not be expected to do the impossible, nor must they be leant upon as an excuse for lessened effort inside the State. They protect a country from a very large percentage of the diseases which threaten it from time to time, and they do a great and invaluable work. And it is a work that is perhaps less known and appreciated by the public than it should be. This is of the nature of things for all preventive work, the very success of which leads to negative rather than to positive results. As long as a country is free from disease of a contagious nature no one has occasion to stop and ask himself why this is so, or to think of the work being done at the quarantines. If a case of disease gets past the quarantine and subsequently develops inside the country it naturally becomes the subject of widespread comment. The other instances in which disease is quietly arrested and stamped out remain unnoticed, unheralded, and unsung.

DO NOT NEGLECT DISEASE.

“The Federal quarantine regulations are doubtless of an excellent character, and the internal quarantine regulations of this State are framed on

modern general characters to meet the peculiar conditions of the country ; but I think the State of South Australia and the other States of the Commonwealth could be even better protected by the enforcement of more stringent quarantine regulations relating to wild and undomesticated animals for zoological and menagerie purposes, and for animals attached to travelling circuses. Extreme caution is necessary. I do not imagine for one moment that anyone present would think of neglecting disease amongst their animals, but at times we come across men who, though not usually wilful, from a kind of negligence and want of energy fail to do what they ought. For instance, they may go into a market and see a cheap lot of cattle or pigs. They do not ask if they are nasty or not, but buy them and take them home. They would then be put with the other cattle and pigs, and a few weeks afterwards a serious outbreak of disease would result, causing enormous loss and inconvenience to all the farmers in the district. You gentlemen who represent the farming and stock-raising industries (to whom the success or failure of these industries is of the greatest personal importance) can demonstrate to your neighbors the necessity of co-operating with the Stock Department in promptly reporting suspicious cases, and by carrying out the instructions of the department. The ABC of prevention consists in preventing the introduction of disease or anything which will produce disease. Plants, *e.g.*, Cape tulip, belladonna, ragwort, &c., are noxious and poisonous, and liable to cause deaths amongst stock. Zealous war should therefore be waged on all noxious and poisonous weeds, and they should be eliminated from the pastures.

DIGESTION.

"On the farm we find that sufficient care is not exercised in preventing some of the common ailments and diseases affecting live stock. Amongst the many inquiries received by the Chief Inspector of Stock, a large number deal with diseases of the digestive organs. The diseases of the digestive organs most commonly encountered are chiefly caused by dietetic errors. Horses should be fed regularly, and in small quantities at a time. Never give food in excessive or insufficient quantities. In order that the food should be thoroughly masticated, the teeth should be attended to. Sudden changes of food, damaged food, dry, innutritious food are all fruitful sources of digestive derangement. Farmers should always be on the lookout for signs of indigestion, *e.g.*, bad smell in the mouth, undigested food in the manure, &c., and rectify feeding accordingly. The water supplies should be pure and free from all contaminating influences, and much trouble would be prevented by watering the horses in a systematic manner. If water is always before a horse he will not take too much. Water horses three times daily before feeding. If given after feeding water weakens the digestive juices, the food will be washed out in an undigested state, and indigestion and colic will result. During a journey water horses when they want it, as long as you

keep them moving. Cleanliness in and around stables, loose boxes, and yards should be one of the chief aims of the up-to-date farmer. Unfortunately in Australia a number of farmers and stockowners exhibit a strange fondness for accumulations of manure near feeding and watering troughs, and the habit of bedding horses with manure is common. Unquestionably such insanitary methods are predisposing and active causes of disease, and should be strenuously attacked by the authorities. The ingestion of manure is neither wholesome nor palatable. The grooming of horses will do much in preventing skin troubles, and regular attention to the feet will save many a horse from foot troubles, *e.g.*, sandcracks, thrush, and canker. The extraordinary large number of cases of sore shoulders reflects sadly on the intelligence of the horseowners. Here the saddler acts as the good Samaritan and saves hundreds of horses from wanton cruelty. If practical saddlers were given more say in fitting collars and saddles we would have fewer sore shoulders and galls.

VARIED ADVICE.

"In a paper such as this it is impossible to deal with all the ailments and diseases to which live stock is heir to, but the preventive treatment of a few of the common cattle diseases should prove serviceable. Hoven or gas in the rumen of cattle and sheep is a common affection in certain districts, and may cause considerable loss. The chief exciting cause is a sudden change of food, *e.g.*, from grass to clover or lucerne. In turning cows into rich clover or lucerne for the first time, do not put them in first thing in the morning. Put them in midday or the afternoon—they are not so greedy then. Leave them in only for about one and a half hours. Next day put them in a little earlier and allow them to remain longer, and so on until they are used to it. Of all the problems in modern therapeutics the treatment of a parturient apoplexy, commonly called milk fever, stands pre-eminent. It is an example of successful curative treatment being discovered before the pathology of the disease is known. It has always been recognised that plethoric cows (heavy milkers), are predisposed to parturient apoplexy. Preventative treatment consists in limiting the food supply for a few weeks before calving. The cow should receive a purgative a fortnight before calving, and, if necessary, one immediately after; and she should be milked about 21 days or 14 days before calving. This system of prevention has been found very effective. The measures recommended by the Stock Department for the prevention of paralysis in cattle are well known to you all. I refer to the systematic administration of bone meal and salt, and the regular feeding with wholesome, nutritious food, *e.g.*, bran and chaff, boiled wheat and barley. Farmers and others who have carried out the treatment in a proper manner have had excellent results. Generally speaking, the administration of licks to live stock in South Australia is to be recommended. Parasitic diseases in sheep, cattle, and horses are extremely prevalent in

certain districts, and licks are practically indispensable. Licks consisting of salt and sulphate of iron are largely used for the prevention of stomach worms in cattle and sheep, and similar licks are useful for giving tone to horses and thus prevent the lodgment of strongli and other parasitic pests. The destruction of infected manure would no doubt be a radical method of coping with and preventing loss amongst live stock from parasitic invasion. The practicability of the suggestion is quite another matter. Removal of stock from infected pastures is also beneficial.

UN SOUNDNESS OF HORSES.

"I shall now come to a class of disease which demands immediate attention, and which is at the present moment a topic of absorbing interest. I refer to hereditary unsoundness in horses—hereditary taints which are recognised by all authorities throughout the world; and animals exhibiting any of these unsoundnesses should be excluded from breeding purposes. The diseases are ringbone, sidebone, roaring, cataract, curb, spavin, unsound feet, thoroughpin and bursal enlargements, shivering, and osteoporosis or nasal disease. As this State was being made a dumping ground for rejected stallions, a system of inspection of stallions competing at subsidised shows was inaugurated, and the results of that inspection have clearly demonstrated the urgent need for reform in connection with the horse-breeding industry. Our country is crying out for a healthy, vigorous manhood and womanhood—men and women who will hold their own in the battle of life with any nation. And, gentlemen, you should cry out for sound, well-formed, useful horses—horses which are not only well topped, but whose limbs are free from hereditary unsoundness. It is highly important that you should only breed from sound, certificated stallions. But attention should also be drawn to the soundness of the mares; and it is gratifying to observe that the system of examination at certain shows in Great Britain and some other countries embraces the examination of mares. Preventive treatment for these hereditary unsoundnesses is simple and emphatic. Do not breed from unsound animals. Patronise stallions holding the Government certificate of soundness; and if a stallion is travelling in your district make certain that he possesses the certificate. With the present high rates for draught stock and the extraordinary demand for active animals for the new country steadily being opened up for closer settlement it is most important that only sound animals should be utilised for breeding purposes.

UNITY WANTED.

"You should recollect, gentlemen, that each young horse becomes individually a more valuable animal than the individual young of any other class of the domestic animals. You breed him, and then you have to keep him, handle him, train him for a long time before he is saleable. You spend

a lot of money, time, and care on him before you know whether he is going to be a success or a failure. Therefore, in breeding horses it is essential that the breeding of the young animal should be correct. No mistake should be made in the production of the finished animal. Sentiment, gentlemen, should play a minor part. The present system of examination is certainly not perfect; but we must creep before we walk, and it is no doubt the precursor of a uniform Licensing and Registration Bill, which will have far-reaching effects, and which will entirely exclude the unsound, worthless stallion. All the States in the Commonwealth should show a united front on this matter. A vigorous repressive measure is wanted. A regulation dealing with type-breeding and conformation is also necessary, and it is the intention of the department to introduce such a regulation on lines similar to the New South Wales and Victorian systems. Thuswise we will be able to reject the stallion which, although free from hereditary unsoundnesses, is really unfit to be used for breeding purposes because of bad type and conformation.

CONTAGIOUS DISEASES.

With regard to preventive treatment, as I remarked before, bacteriology has been exceedingly helpful. We have learned in this way the mode of life of the organisms causing contagious disease, the method of infection, and the best means of destroying the microbe; and in certain diseases bacteriologists have provided us with various vaccines for their prevention. The main principles of preventive treatment of contagious diseases are isolation, notification, and disinfection. I shall now briefly describe some of the contagious diseases which have occurred in this State or are still with us, and indicate the most successful preventive treatment.

CONTAGIOUS PLEURO-PNEUMONIA OF CATTLE.

"Pleuro-pneumonia, which many years ago played such havoc amongst the herds of Australia, is still with us, but the disease is well under control—due mainly to the system of slaughtering of all actually diseased cattle, preventive inoculation of cattle in contact with them, and also inoculation of all cattle in the immediate vicinity, and, of course, strict quarantine. Contagious pleuro-pneumonia is a very infectious disease, characterised by high fever and the existence of inflammation of the lungs and their coverings. It frequently ends fatally, or tends to become chronic. This disease is communicated through the co-habitation of animals, and the animal with chronic pleuro-pneumonia, in which a portion of the lung has become encysted and shut off from the rest of the lung, is a constant source of danger. The main symptoms of the disease are a peculiar grunt, which is very diagnostic, hurried breathing, high temperature, and coughing. The cattle hold themselves in a particularly peculiar manner, with the elbows protruding. They do not lie down much. In chronic cases an occasional cough is heard. The

authorities have had trouble with some of the virus used for inoculation. Ignorant persons are liable to take virus from cattle also affected with tuberculosis, or use virus tainted with other organisms. As a consequence, great injury is done, and preventive measures are dangerous and useless. Some years ago the officials of the Stock Department commenced cultivating pure lymph in healthy calves, and in this way kept up a regular supply. Calves 12 months old are tested first with tuberculin, and then only those found free from that disease are used. Clear virus is injected behind the elbow, and in three weeks' time a swelling is observed along the side of the chest. The calf is killed and the virus collected with proper precautions, mixed with a certain proportion of glycerine, and put in sterile bottles. Such a method of securing virus is scientific, and ensures not only freedom from other organisms, but also a regular supply of pure lymph. It is the intention of the department to reintroduce this system. Stockowners who buy cattle in different parts of the State would do well to keep a special paddock for isolation purposes. Many station managers adopt this safeguard with store cattle from suspected districts.

TUBERCULOSIS.

" This is one of the most important diseases met with in South Australia. It occurs chiefly in cattle and pigs; and as tuberculosis in cattle and pigs is practically the same disease as tuberculosis in man the prevention of the disease is of vital importance. Tuberculosis is caused by a rod-shaped organism, which possesses distinguishing staining properties. In fat cattle no symptoms may be presented, the animal apparently accommodating itself to the disease. In others, swellings or lumps may be seen in various parts of the body, *e.g.*, under the ears, under the jaw, in the throat, in brisket, in front shoulders, in flanks, in udder, and in bulls in the scrotum. These swellings may undergo softening and discharge; sometimes they heal up, only to break out again in some other place. When the disease is located at the back of the tongue the animal's head is carried out straight, and a roaring sound is emitted; the noise is made when drawing air into the lungs, and is caused by the tubercular mass pressing on the windpipe. In advanced cases animals become bad doers, fall away in condition, have a dull look about the eye, stilted way of walking, belly tucked up, and a nasty, painful cough. Occasionally persistent diarrhoea is present. In the udder hard swellings are formed, in the posterior part especially. In pigs the chief symptom is coughing, but sometimes swellings are seen under the jaw and in the throat. Pigs in dairying centres frequently suffer from tubercular disease. Pigs fed on skim milk from creameries and raw offal at slaughterhouses are very prone to the disease. At the farm if you suspect an animal to be affected with tuberculosis you should immediately isolate it, and then notify the nearest inspector of stock and the Chief Inspector. The measures adopted by the department in coping with this disease are slaughter of animals showing

clinical symptoms, isolation and application of the tuberculin test to suspicious animals, and subsequent slaughter on reaction. The wholesale application of the tuberculin test—a sure method of diagnosing tuberculosis in cattle—is impracticable in South Australia. Governments all recognise the usefulness and reliability of tuberculin test, for no civilised country will permit the importation of cattle (unless for immediate slaughter) which will not pass the test. As the chief cause of the prevalence of tuberculosis is the continued existence amongst the herd of animals with serious symptoms of disease isolation and notification should be resorted to at once.

ACTINOMYCOSIS.

The disease 'lumpy jaw' or 'actinomycosis,' which also affects cattle, may just be mentioned in passing. You are all familiar with it, and know that it is spread by means of discharge from suppurating tumors or swellings. The cause of the disease is the ray fungus—a microscopical organism. The disease affects the jaws, tongue, the soft tissues under the jaw, rarely the udder, and still rarer the lungs and other internal organs. It is generally believed that the parasite forms on certain grains, and most abundantly on barley. Immediate isolation and notification is necessary, and as the disease is a curable one in the early stages the sooner this is done the better.

CONTAGIOUS OPHTHALMIA.

Contagious ophthalmia, or eye disease, in sheep and cattle is common in South Australia, and rather serious outbreaks have occurred. The disease is due to a specific virus, and is very contagious. Flies and other insects play an important *role* in disseminating the disease, and as they are also without doubt responsible for the spread of many other diseases due to minute organisms much can be done in preventing the multiplication of flies in seeing that the material upon which they feed and multiply, *e.g.*, garbage, is immediately destroyed by fire or other effectual means. If this is done the spread of disease through their aid will be materially diminished. The spread of the contagious eye disease in sheep and cattle can be prevented by isolating affected animals and dressing eyes with an antiseptic eye wash.

SWINE FEVER.

"Close quarantine and prevention of movements of swine from infected premises except fat pigs, which can be sent to slaughter-houses or bacon factories for immediate slaughter with impunity, appear to be an effective method of dealing with the type of swine fever now met with in this State. When the premises are in a very insanitary condition—sties of wood—the sooner the pigs are fattened off and slaughtered the better. Afterwards the sties should be destroyed by fire, and paddocks ploughed up with lime; boars should be immediately castrated or destroyed, otherwise successive

litters will be a continual source of annoyance, and the destruction and disinfection of the premises unnecessarily delayed. Owners of pigs who wish to prevent the introduction of swine fever and other disease amongst their pigs must attend to the general structure and sanitation of sties and paddocks. The feeding of pigs should also receive attention. Fermenting mixtures in the swill barrel are extremely liable to produce gastric and intestinal derangement, and predispose animals to contagious disease. Owners should arrange a sty at a distance from the main piggeries, where all new purchases can be kept for a few weeks, to make sure that they are not diseased.

OTHER SWINE DISEASES.

Recently the Chief Inspector of Stock has had his attention directed to two other diseases of a contagious character affecting pigs. One outbreak, which occurred on both sides of the Murray, affected young pigs and caused a large number of deaths. The disease, on investigation, proved to be a form of septicæmia peculiar to young pigs, the germs evidently gaining entrance by the umbilicus (navel). Isolation, strict cleanliness and disinfection, and cleansing and disinfection of premises before sows litter are the chief measures to be adopted by the farmer for the prevention of this disease. A form of septicæmia, with fever of a relapsing character, was also seen amongst a large number of pigs kept under very insanitary conditions. The removal of the pigs from their filthy surroundings checked the disease, which was assuming an epidemic form. I have already remarked on the part played by insects in transmitting disease; the pig louse may prove to be an important carrier of disease germs, and dressing and dipping may yet become a useful preventive measure for swine fever and analogous affections.

LOCKJAW IN HORSES.

"Tetanus or lockjaw in horses continues to destroy a large number of valuable horses every year, and as this is a preventable disease the farmer should make himself familiar with it, and the measures to be undertaken for its prevention. The germs of the disease are found in soil, and chiefly in soil in manure-laden stables and yards. The germs gain entrance to an unprotected wound, remain there, and immediately commence forming poisonous toxins, which get into the system and set up the awful symptoms of the disease. If you prevent the impregnation of your stables and yards with manure and attend immediately to wounds, and especially punctured wounds, by cleansing and dressing them with an antiseptic lotion, lockjaw amongst your animals will be practically a negligible quantity. Anti-tetanic serum injected into horses with punctured wounds has been tried, but with indifferent success.

ANTHRAX.

"Two authentic outbreaks of anthrax occurred last year amongst horses and cattle on two farms near Wallaroo. The germs of the disease were

undoubtedly introduced in unsterilised bone and blood manures. The fact of anthrax being communicable to man lends importance to the disease, and a higher incentive to apply measures for its prevention. As the spores of the germs of anthrax will live in the bone for an indefinite period (Gilruth) there should be a prohibition of bones and bonedust from countries infected with anthrax, or thorough sterilisation at the port of entry. In most cases of anthrax there are no premonitory symptoms, the animals die suddenly, tarry blood may be oozing from the natural orifices—the mouth, anus, nostrils, and vagina. In all cases of sudden death amongst stock, especially with blood oozing from the natural openings, immediate notification to the nearest inspector of stock should be made. The carcass should not be opened, it should be burned or buried on the spot. In anthrax, as in some other diseases caused by germs, the system of vaccination has proved of immense value as a preventive. Microbes when repeatedly passed by inoculation through the bodies of certain animals become weakened and lose their virulence. Weakened cultures or vaccines properly employed confer on certain animals more or less protection against virulent doses of the natural virus subsequently introduced by infection or by experimental inoculation. For many years in New South Wales and Victoria cattle and sheep have been vaccinated with weakened anthrax virus, with very satisfactory results. In the outbreaks of anthrax near Wallaroo stock on the farms were vaccinated with good results. However, the general use of such vaccines must be deprecated; suspected outbreaks of anthrax must be very carefully investigated. No case should be diagnosed as anthrax until cultural and inoculation experiments have been completed, and then, and then only, should vaccination be recommended for remaining stock.

STRANGLES AND INFLUENZA.

“Strangles and influenza can be best prevented by isolation, early attention to animals, and cleansing and disinfection of premises. The old method of allowing a disease like strangles to go right through the stable is ridiculous and palpably absurd.

CEREBRO-SPINAL DISEASE.

Outbreaks of cerebro-spinal disease in horses with sudden deaths have engaged the attention of the officers of the Stock Department for a number of years. The disease is caused through the ingestion of damaged, mouldy, or musty fodder, and is due probably to the presence of some toxic agent, which, so far, has not been isolated. Owners of stock who lose large numbers of valuable horses in such a sudden and mysterious way are naturally perturbed *re* the cause, and doubts have been expressed regarding the reliability of the diagnosis. True, the specific agent has not been discovered, but the preventive course adopted has been successful in each instance, viz., cessation of feeding with the damaged food, removal of remaining horses to another part of the farm, and disinfection of premises.

In this connection we may point out that the specific cause of ptomaine poisoning in human beings has not been demonstrated, and yet the diagnosis is hardly, if ever, questioned. Horses should not be fed on mouldy, musty, or evil-smelling forage; such forage should be destroyed.

CONCLUSION.

"My profession has been described as too theoretical. Well, after all, theory may be described as the ferment of practice. Without theory practice will never attain its greatest possible efficiency. This is an age of science. There is an endeavor on every hand to apply the results of scientific research to daily life. If you are in doubt about a disease affecting your stock accept the commonsense view, that outbreaks of disease are mainly microbic or parasitic in character. Adopt preventive measures accordingly. It is a mistake to wait for somebody to discover the causal agent. The causal agent will be discovered in due course. The views I have expressed to-night may not meet with your approval, but they are, at any rate, of a practical character, and if carried out will prove of great benefit to the State and save many valuable animals."

A Delegate—"Will you describe canker in horses' feet?"

Mr. McEachran—"It is caused chiefly from dirt. Horses standing on damp stables full of manure are prone to it. It affects the frog and sometimes the sole. It is a horrible disease; a nasty smell is emitted, and it sometimes affects all four feet. It has been proved due to a particular organism. Here is a very good cure. Use 5 to 10 per cent. solution of formalin regularly and keeping in clean surroundings. Apply once or twice daily. If that is too severe discontinue for a week and then begin again."

Mr. Dawkins (Gawler)—"What is the best antiseptic for a wound?"

Mr. McEachran—"A good lotion for horses' wounds is 1oz. sulphate of zinc, 1oz. sugar of lead, 1oz. carbolic acid (liquid), with a quart of water."

A Delegate—"Is there any danger to horses from drinking immediately after working?"

Mr. McEachran—"No; it is a common thing to give them a drink when in a hot condition; but to give a horse cold water after it has partly cooled down is injurious."

Another Delegate—"Do you favor common salt as a first dressing for a wound?"

Mr. McEachran—"No; I do not believe in it."

Mr. Lock (Whyte-Yarcowie)—"Could we not have veterinary surgeons going around the country forming veterinary classes, teaching the ABC of disease treatment?"

Mr. McEachran—"We are doing our utmost to cope with the work. The department is trying to assist farmers and stockowners, but it would be impossible to conduct classes."

Mr. Dunsford—"Why do so many foals die when about nine days old, apparently from lockjaw?"

Mr. McEachran—"It is a form of blood-poisoning. Germs get in through the navel. The best treatment is to apply a dressing to the navel—a little lysol and water, or cleanse it and apply carbolic oil. Keep it on by tying a bandage round the navel."

Mr. Collins (Mount Gambier)—"Do you advocate isolation for young stock with strangles?"

Mr. McEachran—"As soon as stock are affected with strangles immediately isolate. Give no hard food. Bran mashies or green food and plenty of cold water, and in each bucket use a little saltpetre or chlorate of potash or hypsulphite of soda. Do not lance the abscesses. Allow them to burst naturally if you can, but if not, make a good, clean opening with a knife, the blade of which has been boiled, and then thoroughly disinfect and keep clean."

Mr. Dunsford—"Is stringhalt hereditary?"

Mr. McEachran—"Some horses show a form of stringhalt with shivering, and they should be condemned. But with others, the spasmodic contraction is not hereditary."

On the motion of Mr. Eyre (Georgetown), the four following questions dealt with:—1. "That Congress endorse the present system of veterinary examination." Carried, with two dissentients. 2. "That it should be extended to prevent introduction from elsewhere of unsound stallions." Carried unanimously. 3. "That veterinary examination be extended to all stallions for public use." Carried unanimously. 4. "That owners of rejected stallions have two years in which to get rid of them." Rejected.

CONFERENCE OF HILLS BRANCHES OF THE AGRICULTURAL BUREAU.

The Annual Conference of the Hills Branches of the Agricultural Bureau was held at Woodside on Wednesday, October 19th, the following members being present:—Woodside—Messrs. C. W. Fowler, A. and J. W. Disher, W. King, W. Rollbusch, G. J. Sampson, R. W. Kleinschmidt, H. Newman, J. Keen, F. Baldock, A. Moore, G. Attenborough, R. P. Keddle, H. A. Speehr, G. and J. Johnston, A. S. Hughes, and E. Knuckey; Cherry Gardens—C. Ricks, S. W. Chapman, A. Jacobs, G. Hicks, E. and J. Lewis, A. Stone, and S. H. Curnow; Forest Range—W. McLaren, F. J., and R. Green, J.

Vickers, and G. Monks ; Gumeracha—J. Porter, F. V. Lee, and A. Moore ; Longwood—G. W. Doley, J. R. Coles, W. and J. Nicholls, J. Roebuck, E. and T. Oinn, W. H. Hughes, and E. W. Pritchard ; Uraidla—T. H. Collins, W. H. Curtis, and F. Johnson ; Meadows—G. T. Griggs ; Dingabaldinga—F. DeCaux. The members of the Advisory Board of Agriculture present were Messrs. J. W. Sandford (Chairman), J. Miller, and W. L. Summers (Secretary). A number of visitors also attended.

OPENING ADDRESS.

The Chairman of the Advisory Board, having expressed his pleasure at being present to open the proceedings of this Conference, said he believed the dairying industry in this district, although on an excellent footing, was capable of much larger expansion. Dairy herds might well be enlarged and bigger factories kept in full swing. Hog-raising should accompany the keeping of cows. Each year the demand in Australia for bacon and ham showed an increase on the earlier periods. Shipments of fresh pork were sent to England at a profit, but he saw no reason why the curing of this meat should not take place here, instead of in the British factories. Freight on bacon was less than on frozen meat, and if the curing were done here the establishment of factories in the hills districts would be of value to the whole community. He was glad to say that the Bureau was in working order, but there was still room for improvement in the individual Branches in various parts of the State. The results of experiments and experience gained from time to time, whether of successes or failures, should be made known as widely as possible for the mutual benefit of producers. The Board would continue to do all in its power to further the interests of the Agricultural Bureau.

Mr. Miller spoke of the great value of conferences such as this, and urged delegates to do all they could to stimulate the activity of the Branches, and avail themselves of the benefits to be derived by hearty co-operation with the Department of Agriculture, in order that the problems of the producer might be scientifically dealt with.

THE WATTLE BARK INDUSTRY.—PROTECTION NEEDED.

Mr. J. Porter, of the Gumeracha Branch, read the following paper dealing with this question :—" It is not my purpose to advocate any special method of cultivation or handling of wattle bark, but to discuss the effect on Australian growers of the importation of wattle bark from South Africa. We have hundreds of square miles of country that will give a better return under wattles than any other use to which it can be put, and thousands of people who rely upon their wattle bark to balance the ledger. We boast a white Australia, yet we have to compete with black labor. The Australian grower

has to pay 7s. or 8s. a day to have his bark stripped, while the over-sea competitor is paying about as many pence. We have to pay high prices for our land, and also a land tax, while the other fellow secures his land for much less outlay, and pays no land tax. After working on the cheap all along the line, by making use of tramp steamers, he can send his bark from Natal to Sydney at a lower cost than we can send ours from Adelaide to the same port. I think every Australian is willing to meet a rival on fair or even conditions, but these are not even. All the advantages are against us, and we are quite justified in asking for a heavy duty on wattle bark coming into the Commonwealth. Other industries under similar conditions are protected, and under present conditions, with a rapidly-increasing quantity coming from Natal, we may expect to see the price of wattle bark so low as to leave no margin of profit over the cost of production. There is also the probability of introducing stock diseases in the bark. South Africa is notorious for stock diseases. Quite a number of these might be passed along to our shores in the wattle bark. We were told a short time ago that, thanks to our quarantine regulations, Australia was practically free from stock disease. Is it too much to ask that the quarantine be extended, so as to guard against the possibility of introducing disease by other means than the importation of live stock? Some may think I am trying to raise an alarm without just cause, but I think anyone who knows the habit stock have of rubbing themselves against trees, and thus leaving disease germs on the bark, will recognise that the danger is a very real one. A few years ago the danger of bringing in disease by importing bonedust was pointed out, and steps were taken to prevent it. In my opinion the danger of introducing disease through the agency of the wattle bark is much greater than by bonedust."

Mr. Porter then moved that the following resolution be sent from this Conference to the Hon. Minister of Agriculture—"That a duty be placed upon all wattle bark imported into the Commonwealth." Seconded by Mr. W. H. Hughes.

Mr. A. S. Hughes was not in favor of the resolution, as this was an exporting country, and if we expected to be able to send our surplus production in certain lines to South Africa and other countries we must extend the same freedom to them in regard to their products. The question of the likelihood of the introduction of stock disease should be thoroughly investigated, as it would be disastrous to admit some of the very serious diseases rampant in South Africa.

Mr. W. Nicholls opposed the motion. He was of opinion that the wattle bark industry in this State would before long reoccupy its former position and be able to hold its own.

Mr. A. Moore (Gumeracha) said that bark was sent from Australia to New Zealand and England, and the production was still sufficient to supply the

demands of the Commonwealth; therefore the industry had every claim for protection.

Messrs. Monks and Keddie also supported the motion, which was then carried by a majority of 11.

Some pieces of wattle tree were exhibited by Mr. Hughes which were diseased or attacked by insects. It was decided to obtain a report from the department respecting this trouble.

CULTIVATION AND MANURING OF ORCHARDS.

Mr. W. Nicholls (Longwood Branch) read a paper on the "Cultivation and Manuring of Orchards." After dealing with the minerals in the soils, and giving useful information with respect to their composition and adaptability to the cultivation of the various fruits, he dealt more especially with the Hills district near Longwood and Mylor. It would be seen that the soils on the hillsides, where most of the orchard-planting was done, were sedimentary soils, generally of a whitish color, denoting the absence of humus or decaying vegetable matter. This was accounted for by the heavy and continuous rains causing most of the vegetable matter that had fallen on it to be carried down into the gullies. The absence of humus was a serious defect, and one that must be made good before soil could be fertile. Humus absorbed water like a sponge and kept the soil damp. It consolidated a light soil and made a heavy soil more porous, and, while it served to lock up and preserve the potash and ammonia in the soil, its slow decay produced carbonic acid gas, which corroded rock fragments and mineral particles, setting free potash and phosphates which would otherwise be useless to the plant. It was a source of nitric acid, as all organic matter contained the remains of albuminides. Organic matter was acted upon by hosts of bacteria which caused nitrification to take place, and the newly-produced nitric acid combined with lime, which was one of the most important elements of plant nutrition. Where humus was absent from the soil artificial manures helped them but little in building up the fertility of the orchards. Such soils needed stable manure or green crops ploughed in. Situated many miles from any great source of stable manure they found the first method too expensive; they therefore grew crops of field peas, vetches, and other green crops and ploughed them in the flowering season in early spring. Lime was an absolute essential to the fertility of the soil. It was a plant food; it served to counteract sourness, and was necessary for the preparation of other plant food in the soil. No form of manure, with the exception of one or two chemical fertilisers, could possibly supply the needs of the orchard unless there was a sufficiency of lime in the soil. It could not retain the potash and ammonia as applied to it unless lime was there to change and modify their form. The germs which helped plants to gather nitrogen from the air, and still more important germs which turned ammonia into nitrates, were unable to work

in a sour soil. Any soil containing less than one part of lime to 200 parts of soil could not be manured highly or economically brought to a high state of fertility. Too much water in the soil was the cause of sourness. One hundred pounds of fairly heavy clay soil would hold about 40lbs. of water, but not more than half that quantity should be retained by a fertile soil. If more water than this was in the soil its interstices were filled with water instead of air, and consequently there was a deficiency of oxygen, which was one of the principal agents in promoting chemical action. The remedy was to drain the soil. Draining changed the water in the soil from a stagnant to a moving state and led to a good mechanical condition. Drained soils were always warmer than undrained, as the rain water passing through brought air with it. Under drainage had the effect of making the soil much more friable and mellow. It could be worked earlier after heavy rains. Of course, all soils did not require draining, but most of the orchard lands of the districts mentioned did. The best method depended upon local conditions, cost of materials, &c. Probably the best and cheapest in the end was earthenware pipes. Efficient drains could be made with stones broken to the size of road metal and laid about a foot deep in the trench and covered for a few inches with ti-tree or other brush. A good drain could also be made with wooden slabs laid lengthways along the sides and top, and covered as in the case of the stone drain. Whichever method was adopted, he suggested that the drains should be about 2ft. 6in. deep and 20ft. apart, with an even fall, as straight as possible and a minimum of lodgment for sand. Having established the principles they should have little difficulty in applying them to the varying local conditions. As a general rule timber should be grubbed out and the roots run down to a depth of about 16in. The scrub knocked out and the land broken up with a plough and a subsoiler to about 15in. When thus broken up it should be harrowed, rolled, and cross-ploughed, and then worked down fine. Small areas and steep hillsides would probably be broken up to greater advantage by the ordinary system of grubbing. Whichever system was adopted it should be remembered that too much working of the land in its original preparation could not be given. Never again would the same opportunity occur for thoroughly breaking the soil, and much of the success of the young orchard would depend upon the condition of the soil when the trees were first planted. After that only a comparatively small area of the orchard could be deeply worked. No effort should be spared to make the preparation thorough and complete. In the matter of manuring orchards they could only lay down general principles. Their knowledge of the subject was still far from complete. The guiding principle which seemed to be definitely established was the need of potash and phosphate, and they should experiment on their individual orchards. In other parts of the world experiments had established that nitrates promoted growth, making the leaves dark and vigorous; that potash increased

the quality, and phosphates promoted fruitfulness and general stability. The principal source of nitrogen was nitrate of soda and sulphate of ammonia, containing 15½ per cent. and 20 per cent. of nitrogen respectively. The orchard having soil well supplied with humus and in a proper state of cultivation would in most cases require but little in the shape of additional nitrogen and potash. The same could not be said of phosphates. This was undoubtedly the most essential of all orchard manures. No hard and fast rule would apply, but the following dressing was suggested:—Bonedust, 300lbs.; mineral super., 150lbs.; sulphate of potash, 100lbs. to the acre, applied in the autumn; and on a sandy soil somewhat deficient in humus, where the trees were showing a want of vigor and unhealthy leaves, 100lbs. of sulphate of ammonia was added to the above mixture, with good results.

Mr. Roebuck had tried various kinds of drains and found the stone drain the most effective.

Mr. Moore (Gumeracha) considered the drainage scheme advocated in the paper was too expensive for practical purposes. Drains made of three to five round poles laid in a trench cost very much less, and, in his opinion, were just as effective.

Mr. Curtis thought pole drains were practically no use. Slabs made the best drain of all, and pipes and stone came next.

Mr. Monks agreed with the views expressed in the paper respecting the cultivation of the soil. He would like to see arrangements made for samples of soil to be tested free of charge by the department. He considered orchardists needed the cheapest effective system of draining possible, and among the various methods the pole drains held an important place. The soil for orchard-planting should be broken up to a depth of 18in.

Mr. Griggs thought slabs cut green made the most effective drains; he had not found small metal a success.

Mr. Summers was glad that in the paper emphasis had been laid on the importance of having the soil in a good physical condition. Orchardists were, to an extent, handicapped in the use of manures, as the results of applying different fertilisers could not be gauged with accuracy. Growers were not, as a rule, prepared to say definitely that manuring their trees paid. Young trees that were lagging behind the others had been greatly benefited by the application of superphosphate and other manures.

Mr. Nicholls, in answer to questions and in his general reply to criticism, said large stones for drains were easily blocked up, while small stones had not that disadvantage. He estimated the cost in his district of preparing land as suggested in his paper, at about £20 per acre. Drains on hill land need be no deeper than 2ft. 6in.; but in the flat country they were better if made 3ft. deep. The results from the application of manure depended largely upon the quantity of lime present in the soil. In his locality bonedust acted more quickly than super. as theirs was an acid soil.

MODEL ORCHARD.

Mr. Pritchard (Longwood Branch) moved—"That the Government be asked to establish a model orchard, run on commercial lines." In outlining the scheme the mover said the orchard should be charged with all the labor, material, and interest on the capital expended before the trees came into bearing. The balance-sheet and an account of operations should be published every year in the *Journal of Agriculture*. The grower would see things practically carried out; but, at present, he had to take for granted many things he was told. The practical orchardist had no time to reason out why he should follow the suggestions made to him, but the proposed orchard would satisfy all. Mr. W. H. Hughes seconded the motion. He thought experiments carried out in such an orchard would be of great benefit to the growers.

Mr. Summers said that the mover and seconder of the resolution were at variance. The former asked for a model commercial orchard and the latter for an experimental orchard. It was not possible to run an experimental orchard on commercial lines. An experiment which might prove something of great value to the growers as a whole might be a dead loss to the man who conducted it. A model orchard, such as suggested, might prove that fruit-growing paid under the particular conditions of the locality in which it was situated, but would not necessarily give similar results to those which would be obtained only a few miles away.

Mr. Nicholls said the proposed orchard would not interfere with those already established. There were hundreds of growers in the State who were not willing to follow the advice of the department, and the proposed orchard would afford the Fruit Expert the opportunity to prove to them that the methods advocated would increase the monetary returns. Several other speakers opposed the original motion, which was then put to the meeting and lost.

NEXT CONFERENCE.

It was decided to hold the next Conference of Hills Branches at Cherry Gardens.

HOW TO OBTAIN BETTER PRICES FOR PRODUCE.

Mr. W. H. Curtis (Uraidla) read a paper under this title. There was never a more critical time in the history of market gardening than this, he said, and this was mainly caused through the ridiculous prices obtained for produce. All should make an effort to improve the state of affairs, and not leave that most important question to a few, as had been the case in the past. In order to obtain immediate relief he would suggest the formation of an association of fruit and vegetable growers, whose interests were identical, with branches in the leading localities of fruit and vegetable growing. The present system of disposing of their produce was wrong, and the sooner it was remedied the sooner living prices would come to the hard-working market

gardeners. Some disabilities of a few years ago in respect to the market had been overcome by the new company, and the erection of up-to-date buildings, but there were still great needs to be met. He would suggest that the proposed association should wait upon the Government, pointing out to them the present system, the market hours, unnecessary handling of perishable goods, and the ridiculous system of selling. At present the buyer was buyer and seller too. To all intents and purposes there was a monopoly of the kind which the present Government had promised to check. They should ask the Government to build a *depôt* to be conducted by the State, so that the producer and consumer would be brought into closer contact. All would participate in the profits, instead of a few becoming rich at the expense of others. With a huge business such as this in the hands of a few, as it was at present, it was impossible to get full benefit from the fruit and vegetable industry. He did not want to pull down any honest company. If any company had gone to great expense to provide accommodation for gardeners, and if compensation was due, it should be granted. Nevertheless, a combine of six packers practically determined what 2,000 gardeners should receive for their goods and when they should come to market. The leakages that were now occurring in the trade should be stopped, and the value of the produce thereby increased. The system suggested was successful in the largest cities of the world, and was it not good enough to give it a trial in South Australia?

Mr. Ricks said the fruit and vegetable *depôt* previously in existence failed because of the lack of support from the fruitgrowers. At Mildura an association sold the fruit on behalf of the whole of the growers, and thus they received a fair price. The local growers had only themselves to blame for the position they were in.

Mr. Keddie agreed that the fault lay with the growers, and urged the need of co-operation.

Mr. Curtis, in replying, said he was in favor of selling by auction. The *depôt*, when in existence, had acted as a check upon the combine that existed in the market. He condemned the fixing of the prices by the packers.

POTATO-GROWING.

Mr. G. W. Attenborough, of the Woodside Branch, read the following paper:—"As the average farmer in this district can grow from one to ten acres or more of potatoes successfully, I would speak more about how to grow them without irrigation. First, sow a crop of peas in May. They will be out in flower in September, when they may be ploughed under for green manure, after which the land should be harrowed and rolled. About the end of November the land should be subsoiled, and in the beginning of December the potatoes should be planted, with about 5cwt. of mineral super or bonedust to the acre in the rows with the potatoes. Put after that, broad-

cast, about 1½cwts. of potash per acre over the land and harrow in. It is absolutely necessary to plant the potatoes in December to have a successful crop. I have seen nearly everybody make a great rush to get their potatoes in in September and October, and years ago I did the same, but I found it a great mistake. If potatoes are planted in December there are no weeds to contend against, and there is no need to do any more to them until digging. No worms get in them as in the early potatoes, and the potato fly does not attack them. They will also stand a lot of dry weather and look well when earlier ones are dying for want of rain. The autumn rains come in March or April, when they are in flower, and make a good crop. The early potatoes want a good 2in. rain during December, which rarely comes, and they are generally a failure. Most people take the flat or the gully; but if you have a hillside facing the west, with a fair depth of soil, that is the best position. Do not be afraid to go right up the hill if the soil is good, because if you are in the gully you are likely to get frosts, which the potatoes cannot stand, and they would rot with the heavy winter rains. If on the hillside the land has good drainage, and the potatoes can be left in the ground a month or more after ripening without any damage. Soil that has a depth of about 12in., and not actually poor, is good enough. In fact, I have grown some of my finest potatoes on poor, sandy land. Some people are very particular about their seed wheat or peas, but they seem to think anything is good enough in the way of potato seed. My advice is, get the finest and largest potatoes you can, and cut them down to one or two eyes. It will cost you more in seed, but it will pay better in the end. Get potatoes that were planted late the previous season, and if possible spread them out in a shed to a single depth to keep them from sprouting and growing. The best potato to plant under the above conditions is the Snowflake, as it takes a long time to develop, will stand a lot of dry weather, and will realise nearly as much in the market as any other sort. I have grown Up-to-Date and Redskin, but have always come out the wrong side of the ledger with the two last-named. The Snowflake has always returned a profit. We can grow from four to five tons per acre, and that is the average yield at Mount Gambier. Our potatoes are worth £1 per ton more than the Mounts, and it costs them another £1 per ton to put them on the Adelaide market; and if it will pay the people at Mount Gambier to grow them it ought to pay us. The average price of potatoes for over 11 years is from £5 to £5 10s. If we can get four and a half tons per acre and £5 10s. per ton that is £24 15s., and the cost per acre would be about £13 15s., made up as follows:—Manures, £3 10s.; seed, £3 15s.; cultivating, £2; digging, £2 5s.; carting, £2 5s. That would leave a profit of £11 per acre, which is more than a farmer can make from any other source. If green manure is not turned in, nitrogen should be supplied in the form of nitrate of soda or sulphate of ammonia, about 1½cwts. per acre; and in any case the land must be ploughed and harrowed during September or October to keep it moist until planting time."

Mr. A. S. Hughes thought that no potatoes were now coming from Tasmania and Victoria, and that this was destined to give a big lift to the industry in this State. He would not again plant the tubers in the flats, but, as suggested in the paper, would keep them on the hillsides.

Mr. Curtis said it was necessary to obtain a yield of not less than 8 tons per acre at Uraidla to make potato-growing pay.

Mr. Johnson had dug up to 8 tons of potatoes per acre at Uraidla, grown without irrigation.

Mr. Oinn spoke of the possibilities of improvement of the potato yield by selection of seed.

Mr. Sandford considered not enough attention was paid to this important matter of selection of seed. In regard to potatoes coming from Victoria, he said large quantities were continually arriving from the Ballarat and Warrnambool districts.

IRISH BLIGHT.

Mr. Ricks asked what benefit the community had received from the action of the department in inspection and advice concerning Irish blight. He had adopted the precautions recommended—new seed, new land, &c., but still had the blight in the crop. A practical remedy was needed to assist the growers.

Mr. Curnow said Mr. Ricks had not fully followed the advice of the department in this matter. Though the seed may have been new and clean, it was put into soil which was badly infected with the blight last year.

Mr. Sandford pointed out that to get a clean crop it was absolutely necessary that every precaution should be taken. The potatoes must be planted in soil which was absolutely free from blight spores. Seed must be perfectly clean and growing plants must be sprayed. Great care must be taken when importing seed that it should not become infected by unclean seed, bags, &c.

Mr. A. S. Hughes asked if any gentleman had sprayed potatoes which were affected by Irish blight and what the result was.

Mr. Oinn had sprayed last year when the plants were about 6in. high, using Bordeaux mixture. The disease seemed to be checked somewhat, but with the advent of warm, moist conditions it showed renewed activity. A second spraying was given and the crop of tubers was very fair. In his case the spraying was undoubtedly beneficial.

Mr. Summers, as the result of experiments with spraying potato crops, was of opinion that the practice was of great value in combating the Irish blight in the main crops, but, so far as he could see, the only way to grow early potatoes in the ranges and on the plains was to procure some variety which was blight-proof, as conditions favorable to the development of the disease existed over such a long period while the potatoes were growing vigorously that spraying did not keep it under.

Mr. Curtis said the outlook for this season's crop was better than that of last year. The severe restrictions in the matter of quarantine would, in his opinion, hamper the industry.

Mr. Attenborough thought it was hard on the grower that even clean potatoes could not be sent beyond certain borders.

Mr. Curnow quoted an instance of a grower who had dipped the sets in formalin before planting and sprayed the plants twice with bluestone mixture. In his plots there was only a very small trace of blight, while his neighbors had lost their crops. He considered the existing quarantine regulations were quite necessary. In the absence of these restrictions diseased potatoes would inevitably be sent to districts which were now free from the blight, and it would quickly obtain a footing there.

Mr. McLaren said that he had been informed by Mr. Quinn that the spores of the blight could not live in the ground through the dry weather unless there were some potatoes left in the soil.

Mr. Summers—"How are you going to get every potato out?"

COMBINATION OF PRODUCERS.

Mr. A. Moore (Gumeracha) read a paper dealing with the lack of co-operation among producers. He said that while the principle of combination was undoubtedly good, among primary producers it had been very little applied. There was less combined effort to-day than 50 years ago. Each grower was hoeing his row in his own way and not troubling to ascertain whether many farm operations could not be more economically and expeditiously performed by combined effort. On the other hand, labor, and most, if not all, of the manufacturing industries had grasped the situation and reduced the principle of combination to a fine art. He had no quarrel with the principle of unionism or combination as practised by any section of the community for the purpose of mutual benefit. It happened sometimes, however, that the forces arrayed against the grower were oppressive, and, in self-defence, sufficient co-operation was needed in their ranks to enable them to have more voice in the general management of their important industry. Consideration was needed in the three main departments of farm life—buying, selling, and working the farm. It was reasonable to assume that there was some advantage in placing large orders. An order for 100 tons of manure could be as easily given as for a smaller quantity, and the time of both merchant and grower was saved. Some orchardists awhile back had combined to purchase spray pumps, and a reduction was made in the price for taking a number of machines in one line. In selling the need of combination was even more evident. All the world over large parcels commanded more attention than small ones. A merchant could buy 100 tons of produce as easily as 1 ton. Where many different varieties of products were raised in one district, and no very large quantity by any individual grower, the question

of bulking some of the lots and selling in one line was worthy of consideration. It would possibly be of mutual advantage to merchants and growers if much of the hay produced locally was sold in this manner. The same might be said of wattle bark and other lines, and it should be remembered that the apple export trade had been handled on somewhat the same lines with satisfactory results. Probably the most important proposition was combination in working the farm. So far the farmer had not been greatly inconvenienced by labor troubles. It was wise, however, to prepare for contingencies, as the time would probably come when strikes would occur on the farm as they now did elsewhere. Farm labor had not yet been organised, but it looked as though it would be in the near future. He would, therefore, suggest that a definite scheme of combination or co-operation be attempted to deal with any possible emergencies. A scale of rates might be prepared of the value of the work to be done for each member: A price could be fixed for ploughing, drilling, binding, carting, wattle-stripping, &c., covering all the phases of farm work. In emergency producers could then help each other until the difficulty was over. While advocating loyalty to brother producers in times of labor difficulties, they should not forget the various factories in operation in the district which were a source of benefit to the producers. In case of trouble and the stability of those factories being menaced they would be quite justified in helping to supply the necessary labor from their farms and families. Labor difficulties on the farm and garden might not be so far distant as some people imagined. A year or two ago all the men in a hay-field threatened to leave the crop as it was if the farmer's neighbor, who had come over to lend a hand in gathering in the harvest, did not immediately stand off. A strike in the Clare vineyards, for which the proprietors were not prepared, caused the owners considerable loss. The trouble at Renmark, which was successfully overcome by the co-operation of the fruitgrowers there when the pickers went on strike, was significant of both the possibility of difficulties arising and being successfully overcome by combined effort on the part of the producers.

Mr. Fowler said that co-operation in this district would never have been accomplished had it depended upon the farmers. The townspeople had found the money in the past to finance efforts along these lines. The local co-operative venture had been a big concern, paying top prices. The producers, however, ceased to support it when they found they could get slightly higher prices from certain other factories, and the company had to be wound up. It then returned 23s. for 17s. 6d. shares.

Mr. Summers said it was difficult to get fruitgrowers to co-operate if the expenditure of money was involved. Some fear seemed to prevent growers from coming together and trusting each other. Great saving could be effected by combining to purchase supplies in bulk. He was satisfied that nothing could do more to put the producing industries on a better footing than a

proper system of working together, but he was not very sanguine of getting this happy state of affairs.

Mr. Nicholls considered there was no more disorganised section than the fruitgrowers at the present time. Producers should endeavor to alter the conditions which now compelled them to take what was offered for their products.

Mr. A. S. Hughes said it seemed that the farming community could not manage to combine their forces.

Mr. Miller agreed with the foregoing opinion, and said that in New Zealand the reverse was the case. There farmers' co-operative bodies were progressive and wealthy. At Renmark difficulties in the matter of marketing of their produce had been overcome by organisation.

Mr. Keddie thought every man should fight his own industrial battles single-handed. He did not hold with co-operation.

A GOVERNMENT JAM, CANNING, AND PULPING PLANT.

Mr. Waters, of Forest Range Branch, sent a paper urging the establishment of a plant to deal with surplus fruits. He referred to his original treatment of this subject as reported on page 1013 of the *Journal of Agriculture*, June, 1910, issue. "In view of the fact that some hundreds of thousands of fruit trees had been planted out within the last 10 years," he said, "and that a large number of them would soon be in bearing, while many were in bearing now, they would agree that something should be done to get rid of the surplus fruits, and that a jam, canning, and pulping plant should be established. They were quite aware that the export trade would not take nearly enough of the surplus fruits to ensure a payable price to the producer. Local requirements had been overtaken, and the supply was still increasing rapidly. Freights were too high to allow competition with fruit-exporting countries nearer to the European markets. The prices which had obtained locally during the last few years had been so ridiculously low as to leave no margin of profit. Last year he had seen hundreds of bushels of plums rotting under the trees, and yet thousands of pounds' worth of jam was imported annually into this State. Something must be done to remedy this state of things. The Government, in his opinion, should be asked to erect a factory, not necessarily in competition with others, but to ensure to the fruitgrower protection which at the present time he had not. It was well known that the fruitgrower was wholly at the mercy of the jam manufacturer. Most of them knew what it was to have a good crop of fruit and then get a miserably low price for it. Often it was much more profitable to have a small crop than a large one. A farmer could hold his wheat, but a fruitgrower could not hold his fruit, particularly such kinds as raspberries, strawberries, currants, plums, apricots, peaches, and other soft fruits. If the Government established a canning, pulping, and jam-making plant it would infuse fresh life into a section

of the growers and place the fruit-growing industry on a sounder basis. The fact that the fruitgrowers had tried to work together on co-operative lines and failed was an argument that the Government should step in and help this class of producers. If the jam-makers fixed the price of raspberries at, say, 1½d. per pound, what could the growers do but accept it. He had no other means of disposing of it. At the city markets the same thing applied. If in some years the shortage of certain fruits made it necessary for the Government plant to remain idle he would be in favor of imposing a small tax on growers to recompense the Government."

Mr. Vickers said that the jam manufacturers waited for the fruit to become fully ripe before fixing the prices. It did not pay under present labor conditions to pick and cart raspberries at 1½d. per pound. He was in favor of the proposal.

Mr. A. S. Hughes said that this was a great argument in favor of combination among producers. There was need of a better system of distributing fruit. He knew of instances of fruit being sold at 2s. per case at the market, and double that sum being charged for the same stuff in the western suburbs.

Mr. Summers said that if the proposed factory was established to buy all fruit direct from the grower the Government would probably lose money, unless they kept their prices level with private buyers, as the grower would always take his fruit where he could get the highest figure. The growers should indicate definitely on what lines they wished the Government to co-operate with them to secure reasonable prices for their fruit.

Mr. Keddie thought the proposal would help matters, inasmuch as the Government plant would be able to deal with the surplus in glut seasons and a payable price would be then obtainable in the market.

The Chairman strongly advised members to do their own pulping.

Mr. DeCaux said that as the object in view was to prevent waste, a solution would be the establishment of an inexpensive plant by the Government in a central district where growers could have their surplus fruit dealt with on payment of a reasonable fee, and returned to them with a certificate of purity, to be held for a better market.

Mr. Monks said the whole trouble was due to the system of distribution. If a pulping plant were established growers would be prepared to accept a fair price for their raspberries.

EVENING SESSION.

DAIRYING ON SMALL HOLDINGS.

Mr. Morris's paper on this subject, which will be found on page 440 of this issue, was read by Mr. A. S. Hughes.

Mr. Moore (Woodside) had found chaffed hay and bran the best feed for milch cows. He did not like to have cows calve in winter, but preferred to

have them in full milk at Christmas time. He believed in having a stock of ensilage to carry the cows up to autumn. Ensilage paid better than summer crops. It was best to give most of the skim milk to pigs rather than calves; but, of course, the best calves should be reared for future milking stock and would need a certain quantity of it. He found cattle did best in small paddocks. *Paspalum* and one of the clovers had been proving very good growers, and provided feed for the summer months.

Mr. A. S. Hughes agreed with Mr. Morris that it was best for cows to come in in April. In June and July cream brought nearly double the price realised in October to December.

Mr. Keddie preferred to use super. on pastures rather than bonedust, as the former promoted a more vigorous growth. He considered that it paid to house cows at night. One consideration was the manure which could be used instead of commercial fertilisers and a saving be thus effected.

Mr. Summers said the paper did not convey the idea that dairying was a particularly profitable industry. If 20 acres was devoted to the production of food and 80 acres to grazing, the farm ought to keep 20 to 30 cows. He considered the carrying capacity of the farm had been underestimated. He found that *Paspalum* stood heavy grazing, but all grasses needed a spell occasionally or the stock would eat out the best. Speaking of testing the cows to find out which paid best, he said that in New Zealand a number of dairymen had been asked by the Agricultural Depot to pick the best eight cows in the estimated order of butter production. The cows were then tested, and in only one case did an owner place more than five of his best cows in the eight selected. Some of the tests showed that cows which were considered by the owner to be not paying were amongst the most profitable in the herd. He urged dairymen to test the cows regularly for butter fat.

Mr. Nicholls had found by testing that the cow which was apparently the worst in the herd was the best in regard to the percentage of butter fat. He did not believe in destroying good calves. The way to build up a good herd of cows was by intelligent selection of breeding stock. The Yorkshire Fog grass had been a great success with him. Each year it seemed to improve in food value. After the summer it sprang up with the first shower of rain and provided green feed. He liked to have clover in the cereal hay.

Mr. Coles wished to know whether dairying paid on the hand feeding system, and what would be a fair average return for a cow per year.

Mr. Moore said that, if properly managed, a return of £7 per cow per annum might be expected.

Conference then closed.

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Cradock	*	—	—	Orroroo	*	—	—
Crystal Brook	*	—	—	Parrakie	435	6	3
Cummins	*	12	10	Paskeville	*	12	10
Davenport	415	—	—	Penola	*	6	3
Dawson	416-7	—	—	Penong	430	—	—
Dingabledinga	*	11	9	Petina	431-3	—	—
Dowlingville	*	—	—	Pine Forest	4-4	15	13
Elbow Hill	424	12	—	Port Broughton	*	11	16
Forest Range	438	17	15	Port Elliot	442	19	17
Forster	435	12	—	Port Germein	†	—	—
Fowler Bay	*	—	—	Port Pirie	440	—	—
Frances	*	11	9	Quorn	†	12	—
Freeling	421	—	—	Redhill	†	15	13
Gawler River	*	—	—	Renmark	*	—	—
Georgetown	419	19	17	Rhine Villa	*	—	—
Geranium	*	26	31	Riverton	*	12	10
Golden Grove	*	17	16	Saddleworth	422	18	16
Goode	*	—	—	Salisbury	*	1	—
Green Patch	426	7	12	Shannon	*	—	—
Gumeracha	*	14	12	Sherlock	435-6	12	10
Hartley	439	12	10	Stockport	†	14	12
Hawker	*	14	12	Strathalbyn	*	21	19
Hookina	417	12	—	Sutherlands	436	12	—
Johnsburg	417	—	—	Tatiana	*	—	—
Kadina	*	17	15	Urastlaand Summert'n	442	7	—
Kalangadoo	443	13	10	Utera Plains	434	12	10
Kanmantoo	*	11	9	Virginia	*	—	—
Keith	443	—	—	Waikerie	*	—	—
Kingscote	439	8	6	Watervale	*	—	—
Kingston	444	26	31	Wepowie	*	—	—
Koolunga	*	—	—	Whyte-Yarrowie	421	19	—
Koppio	428	7	28	Wild Horse Plains ..	421	—	—
Kybybolite	†	10	15	Willunga	*	5	3
Lameroo	*	—	—	Wilkawatt	437	12	10
Lipson	*	—	—	Wilmington	418	17	15
Longwood	*	19	14	Wirrabara	*	—	—
Lucindale	*	—	17	Woodside	442	—	—
Lyndoch	†	17	15	Yallunda	*	—	—
Maitland	423	5	3	Yongala Vale	†	12	10
Mallala	†	—	—	Yorketown	*	12	10
Mannum	*	26	31				

* No report received during the month of October.
† Only formal business transacted at the last meeting.

AGRICULTURAL BUREAU REPORTS AND CONGRESS.

As is usually the case, the reports of Bureau meetings held during October deal in many cases only with the reports of the Congress delegates. While these reports are interesting to the members, it is not possible for the department to republish them in the *Journal*, in view of the fact that a full report of Congress has been published. Under the circumstances, therefore, we are compelled to treat the reports as formal, and this accounts for a large percentage of those which appear in the index this month as "formal."

REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, September 21.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Crisp (chair), A. and J. Wallace, Brown, Moten, Cormack, and Thomas (Hon. Sec.).

ENSILAGE.—A paper on this subject was read by Mr. Cormack. This district was well adapted to dairying, he said, and one of the main factors of success in this industry was the provision of succulent feed from January to May. He thought lucerne was better for stock than ensilage. But while in a season like this lucerne could be grown, with the uncertain rainfall of this district it could not always be relied upon, and sometimes would certainly be a failure. Therefore every dairyman should have a supply of ensilage to carry him over the dry months. He was sure that if each dairyman would give ensilage a trial there would be much less waste of good feed in the favorable seasons than there was at present. The natural herbage in these parts made splendid ensilage, as also did wild oats. He had purchased the grass on each side of the railway line, in which there was a quantity of wild oats, and made it into two stacks of ensilage. This kept his cows going until there was fresh green grass. The chief difficulty with stack ensilage was to keep it upright. He therefore unloaded it on to the stacks from either side alternately. There was least waste of all when silos were used, but as an overground silo to accommodate about 50 tons of stuff would cost up to £20, and it might not be required every year, he would recommend stack ensilage for this district. The great value of ensilage lay in the fact that it was possible to stock the land evenly, instead of it being overstocked in the dry months and understocked in the spring. Considerable discussion followed. [In reply to a number of questions the following information was supplied by the Dairy Expert.—Ed.] :—(1) Sour ensilage is made by keeping the temperature below 120° Fahrenheit. When the temperature rises above this the ensilage becomes sweet. (2) The temperature is governed by the pressure. The greater the pressure the lower the temperature is. (3) The amount of pressure necessary depends upon the height of the ensilage and the class of material from which it is made. If 16ft. high the correct weight would be about 5cwts. to the square yard, and as the height of the ensilage increases above this the weight would be reduced. A natural herbage stack of sufficient body can be weighted down by old posts, covered with old bags, and then soil can be placed on the top.

Carleton, October 20.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Gleeson (chair), Fisher, Beerworth, Vater, Ormiston, Williams, Fisher, and Bock (Hon. Sec.).

WHEAT DAMAGED BY FROST.—It was reported that a good deal of wheat in this neighborhood had been damaged by frost. Many paddocks had had to be cut for hay. Mr. Vater tabled a few heads of wheat which had been affected by the frost.

WHEAT SCALES.—Members expressed dissatisfaction at the present system of wheat weighing. They said scales were often over-strained and then did not give a correct reading; the farmer consequently lost. They considered the Government should be asked to erect weighbridges at railway stations for the benefit of farmers, who could then weigh the wheat in bulk. [Members of Branches should bring pressure to bear upon district councils, whose duty it is to inspect and test scales.—ED.]

Coomooroo, September 26.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berriman (chair), Brown, Avery, Robertson, E. and C. Brice (Acting Sec.), and one visitor.

DESTRUCTION OF VERMIN.—This subject was introduced by Mr. C. Brice. To kill rabbits in the summer when there was no green feed about it was a good plan to plough a 4in. trench round the burrows and place phosphorus in this trench and some in the mouth of the burrow. It was not advisable to lay poison all over the paddock, as much would be left behind for the stock to pick up. Netting round waterholes was also effective. A funnel-shaped netting tube was placed from the opening in the netting wall to the edge of the water. The rabbits, after drinking, ran round inside the netting and were unable to find the way out. It was not necessary to have a trapdoor at the end of the funnel. For winter work traps were most effective. The use of these involved a lot of time and constant attention. Ferrets had been worked with great success. They should be muzzled, as otherwise they would eat the young rabbits and then go to sleep. It was necessary to have a net at each opening of the burrow, as if blocked up the ferrets might drive the rabbits into that passage and themselves be unable to get out. Ferrets should be worked early in the morning and only for two hours at a time. They should not be fed before work. **Dogs.**—Farmers' dogs in this district were far more trouble than wild dogs. For the destruction of the former poisoned meat would be found most effective. The paper then continued—"Wild dogs do not take poison so easily. The best method of poisoning them is to place strychnine on the caul fat, heart, and liver of the sheep without touching it with the hands. If the sheep has been killed out in the paddock do not take the fat or heart out of the carcass; leave that for the dogs to do. To trap wild dogs set the trap and cover it in the usual way alongside the pad that the dog follows. Burn some grass on the top to destroy the scent that the hands leave; then place some strong-smelling meat on the opposite side of the trap so that the dog must cross the trap to get to it. **Foxes.**—The best success I have had with these pests is by taking the caul fat out of the sheep and, while hot, cutting it up with a knife and fork and poisoning it with strychnine. Then I take the skin, as soon as I have killed the sheep, and drag it along the ground so as to leave a trail for the fox to pick up, and drop the bait so that the skin drags over it. **Sparrows.**—The only way that I have tried with these pests is to place in a tree where the birds flock a little poisoned pollard, a thin layer on a flat dish. I have had great success that way." In the discussion which followed Mr. Berriman said netting firmly fastened over the burrows would kill the occupants. Mr. Brown had ploughed up burrows and the rabbits did not open up the place again. He considered the brown ferret better than the white for rabbiting. Several other methods were spoken of, such as blocking holes with various materials and the use of poisonous fumes.

PATENT RIGHTS.—Mr. Avery wished to know whether it was lawful to copy a patent ploughshare for one's own use. [The Department cannot act as legal adviser in these matters; nevertheless, we believe it is not legal to copy anything for which the patent rights are still in existence.—ED.]

HORSE-BREEDING.—An instructive address on horse-breeding was given by Mr. Brown and illustrated with sketches on the blackboard.

Coomooroo, October 17.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berryman (chair), Brown, Avery, Kildea (Hon. Sec.), and one visitor.

SCARCITY OF FARM LABOR.—A paper on this subject was read by Mr. E. Berryman. In his opinion it was high time that this question of farm labor was dealt with, to find

some remedy for the scarcity. He thought that members of the Bureau should unitedly take the matter up. Any plan that would get men out of the cities into the country should have hearty support. Farmers were willing to pay a fair wage to a good man, but were unable to procure labor at any price. He thought the chief difficulty was that the laborers in the capital objected to going out singly to work for farmers. They much preferred going about in companies of fifty or more. The farmer wanted a man with whom happy relations could exist, as a vindictive employé could easily show displeasure by firing a crop. Although it might be true that some farmers only retained labor for about two months during the harvest, he was of opinion that this was not so in the majority of cases, and most farmers were willing to keep a good man practically all the year round. There was constant employment in this immediate locality for 10 or 12 men. Seeing that farm life was not now nearly as laborious as in the earlier days, and that practically every farm implement was provided with a seat for the man who worked it, it was surprising that a greater number of men did not take up the work of the farm. In such a season as this the crops would have to remain in the paddocks ripe twice as long as they should on account of lack of labor. The only solution to the problem was a recognition of the need by the Government, and the encouragement of immigration from older countries. Members agreed that something definite should be done in regard to this matter. A man on a farm receiving £2 a week was, in their opinion, better off than a clerk at a salary of £3. Finally, it was resolved to request the Advisory Board to consider this matter, and to bring it under the notice of the Government, pointing out that in this neighborhood 10 or 12 men could readily obtain employment. With the advent of haymaking and harvesting this lack of laborers was much felt.

HAYMAKING.—This subject was also introduced for discussion by Mr. Berryman. He recommended as hay wheats for this district King's Early, White Tuscan, Majestic, and Dart's Imperial. He liked the stooks to be four sheaves deep, or round stooks made by hand. Tent-shape stooks did not get aired well, especially if there were many sheaves to the stook. Big stooks were a failure unless left out for a long time. In ordinary weather carting should be practicable 10 or 12 days after cutting. If the sheaves were left a couple of days before stooking they dried sufficiently, and did not become musty. He advised putting down 6 in. of straw as a base for the stack. The latter should be built with the butts out, keeping the middle well up. Mr. Brown was of opinion that King's Early was productive of sore mouths in horses. It was considered generally that the high hay wheats contained too much straw and too little grain. Gluyas was too thin, and of a wiry nature. Majestic was apparently the favorite, while it was stated that Steinwedel was liked very much by the horses. The best time to cut was said to be when the stem was a golden yellow and the heads dark green. Sweet green hay, with some grain in it, was all eaten and there was no waste, but when it was a little bit on the dry side, with plump grain, it was better for chaff. Oats should be cut when there was a pink color about the stem—if cut green they were bitter. Some of the members thought it a good plan to build the stack in sections, as the hay could then be used without tearing the whole stack to pieces. Thatching paid for the labor, provided the stack was to stand for some time, otherwise a roofing of straw, held on by spikes, was sufficient in this comparatively dry region.

Davenport, September 15.

(Average annual rainfall, 9 in.)

PRESENT.—Messrs. Bothwell (chair), Bice, Hogan, Hewitson, Roberts, Messenger, and Gosden (Hon. Sec.).

POULTRY.—A paper on "Poultry-keeping" was read by Mr. Gosden. The fact that six White Leghorn hens averaged 255 eggs each in a 12 months' competition recently concluded in Queensland (he said) showed that properly managed poultry-farming paid. The best breeds must be obtained, and housing and feeding be properly managed. He had seen poultry stations in Victoria in which rows of houses abutted on either side of a main avenue, and they were so constructed that they could be cleaned out and the eggs gathered without entering the pens. He was of opinion that wet mash feeding was fast becoming obsolete. At the Elsternwick farm dry feeding was carried out in its entirety. The meals were mixed dry, in the proportion of 14 parts pollard, seven of bran, and three of bloodmeal, and fed dry in covered troughs. A little grain was fed at midday, and a good feed of grain given for the evening meal. Green feed was suspended on wires. The grain—consisting of wheat, crushed maize, oats, and sometimes barley—

was fed in the scratching material. The paper continued—"At moulting time raw linseed oil should be given to assist in the shedding of feathers. Many fowl-breeders assert that the dry system of feeding is preventive of crop troubles, for under the wet mash system the crop frequently becomes sour, and when laying hens are affected with these troubles the egg yield is diminished. Dry feeding has been carried out and advocated by our American cousins for some years. Not only the laying birds, but the chicks straight from the incubator, are fed for the first four or five days on dry oatmeal. Then follows a mixed meal of pollard, oatmeal, bran, and bloodmeal, as well as wheat and maize crushed very fine. The chickens should be placed in artificially-heated brooders, and small runs attached to these, so the little birds have good grass runs. From practical experience I have always found the wet mash system suitable for heavy birds where great growth is a consideration; but for the prolific strain—such as the Leghorn layers—the dry system plays an important part in egg production, and its economy speaks for itself." [The Poultry Expert, by actual experiment, has proved the wet mash to be productive of more eggs, as far as South Australia is concerned. At Roseworthy last year, where the winning pen of six birds laid 1,531 eggs, a test was conducted, with the following result:—White Leghorns—Ration including wet mash, 1,207 eggs; fed on dry mash, 1,161 eggs. Silver Wyandottes—Wet mash, 1,173 eggs; dry mash, 1,068. Black Orpingtons—Wet mash, 897 eggs; dry mash, 653 eggs. The same number of birds were in each pen, and all conditions as nearly identical as it was possible to make them. Further tests now in progress are resulting similarly. Unless great carelessness is displayed, the wet mash does not cause sourness in crops.—Ed.]

Dawson, August 27.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. Mayers (chair), Smart, Wilson, Baker, Hughes, Stigwood, and Nottle (Hon. Sec.)

WORKING FALLOW IN SPRING.—The following paper was written by Mr. Kennedy:—"In regard to methods of working fallow a good deal will depend on the conditions under which the land is ploughed and the weather during spring time. Land broken up in June and July will usually need more attention to kill weeds than that which is ploughed later. Since the wetter seasons have been with us it has been necessary to start fallowing earlier than previously, as the land sets very quickly with the advent of dry weather; consequently grass and weeds have to be dealt with later on. I have found it a good practice to harrow each lot of 40 to 50 acres as soon as it is ploughed if the ground is in a moist condition. This operation levels the land nicely, breaks the clods, and also destroys most of the weeds. If it is found necessary to scarify later on to kill the rubbish, better work will be done if the land has been harrowed. Some farmers are afraid of the land setting too hard if harrowed early, but if this is done when the land is in a moist condition it does not run together as it would if worked when dry. It is being generally recognised that it is a mistake to work fallow in spring, unless it is in a moist condition. If land has been fallowed early and nothing else is done until the weeds are going to seed it becomes necessary to scarify in order to destroy them, whether the land is moist or not. I find that on land well harrowed the scarifier can be set shallow, and does more satisfactory work. Land treated in this way will not require any further working to kill weeds, and will be much better to work up in seeding time than if left in its rough state. The surface will break up fine and make a good seed bed for drilling in the crop. Last season I cross-harrowed my fallow early in September, and thus destroyed most of the growth on it. I only had to scarify a few acres afterwards for weeds. In my opinion the ordinary harrow, if in good order and intelligently used, is a most useful implement. Skim ploughs, disc implements, and various makes of cultivators are advocated for working fallow, and they would perhaps pay where a farmer grew a lot of wheat. I consider that they are very little (if any) better than the ordinary scarifier when the latter is set close and given a fair trial. If land is dry in spring time it is best to leave it alone. If sheep are kept on the farm they will eat the weeds; if not, of course, cultivation is necessary. Should rain fall, harrow before the land sets to conserve moisture and make a good seed bed." Some of the members did not care to harrow the fallow too much, as some soils became very hard, and this class of land they thought should be left in the rough to let the rain in, but all the members were of opinion that loose ground should be harrowed.

Dawson, October 17.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. Meyers (chair), Wilson, Quinn, G. and E. W. Smart, Baker, Hughes, Stigwood, and Nottle (Hon. Sec.).

HORSES FOR THIS DISTRICT.—Discussion took place regarding the best class of horse to breed for farm work in this district. Mr. Baker thought heavy draught horses unsuitable. They cost more to feed than lighter animals, and did no more work. He preferred to breed from young nuggety mares, using the best sire he could employ. Mr. E. W. Smart agreed. He pointed out, however, that if a farmer wanted to sell horses he would find that only heavy draughts would command top prices. Mr. Wilson preferred the Suffolk Punch. These had given him the most satisfaction of all. After further discussion, members came to the conclusion that the medium draught horses were the best for work in this district.

Hookina, October 15.

PRESENT.—Messrs. S. Stone (chair), F. Stone, O'Connor, P. and B. Murphy, Kelly Madigan (Hon. Sec.), and one visitor.

WEIGHING WHEAT.—Mr. O'Connor initiated a discussion on the present method of selling wheat on the agents' weights, a system which he considered unsatisfactory. The scales were set correctly at the start, but as each bag was put on, the beam had to strike the top every time, and with slow-working scales this meant a loss to the farmer of from 1lb. to 3lbs. of grain per bag. When the farmer purchased anything, storekeepers and merchants resented it if he weighed his purchase and disputed the sellers' weight; but if he was not prepared to accept the weight of the wheatbuyer he had to take his wheat home again. He considered arrangements should be made whereby the Government would weigh on trucks all wheat delivered at the railway, charging a fair toll for the service. The official receipt should be recognised as final. Discussion followed, and members were of opinion that something should be done to safeguard the farmer in this direction. The Hon. Secretary considered that weighbridges on which wagons could be weighed loaded and unloaded would overcome the difficulty. These could be used for wool, hay, chaff, wood, &c., as well as for wheat. Such an arrangement would pay the Government, and give satisfaction to all.

Johnsburg, September 24.

(Average annual rainfall, 9½ in.)

PRESENT.—Messrs. Brook (chair), King, Smith, Hollett, and Chalmers (Hon. Sec.).

MILK FEVER.—Mr. Smith reported the loss of a cow from milk fever. He was unable to diagnose the complaint until some hours had passed, and he then procured an air-pump from a distance. It was too late, however, to be of use in that case. Shortly after another cow exhibited the same symptoms, and the pump was brought into service. Fresh air was pumped into the udder every two and a half hours from 1 p.m. till midnight. The cow was then given up as dead. After daylight, however, the cow was found roaming around looking for her calf, and she had since been quite well, giving the normal quantity of milk. Members all realised from this experience that every dairyman should have the proper pump on the premises ready for immediate use. They also wished to know whether anything further should be done. [The Dairy Expert replies—"It is not clear whether, after pumping air into the teats, the points of the teats were tied with soft tape to prevent the air from escaping. This is important and should not be neglected. I would give the beast a dose of Epsom salts if she were costive, would keep her warm, massage the udder, and then rub well with the following mixture:—White oil consisting of 1 pint olive oil, 1oz. turps, 1oz. liquid ammonia."—Ed.]

Mount Remarkable, October 13.

(Average annual rainfall, 21 in.)

PRESENT.—Messrs. Bauer (chair), McIntosh, M. and S. Giles, and Lambert (Hon. Sec.).

EXAMINATION OF STALLIONS.—Discussion took place on the examination of stallions, and on the motion of Mr. M. Giles, seconded by Mr. McIntosh, the following resolution

was carried unanimously:—"That this Branch is dissatisfied with the present system of certification of stallions, and is of opinion that the regulations should be amended to remove clauses which prohibit re-examination of a rejected stallion, except under appeal, and that every horse should be examined on its merits, without reference to possible previous examination."

Wilmington, October 13.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Payne (chair), Noll, W. and G. Schuppan, S. and D. George, Litchfield, Scholefield, and Jericho (Hon. Sec.)

EXPERIMENTS WITH GRASSES.—An account of experiments in growing certain grasses without cultivation was given by Mr. Noll. In 1905 he planted seed of Johnson grass on ground previously devoted to wheat-growing. The germination was poor, and the grass did not do well. At the same time some seed of the same grass was scattered in the gravel bed of the creek. This came up, but made little progress; nevertheless it was still there. Some of the seed was washed into his garden and was now growing well. The more it was cultivated and stirred about the better it grew. In May, 1908, he broadcast seed of *Trifolium subterraneum* over his grass paddocks on plain and hills. The first year very little of the clover was seen. In 1909 more of it was visible, and this year it was doing well. He considered this plant would establish itself on the rich ground of this district, but it would not grow on poor sandy soil. *Paspalum dilatatum*.—This plant he had also sown, but it did not do at all well. Sheep's Burnett broadcasted on grass and cultivated land came up well and flourished the first year. Last summer killed it on all the sandy soil, but on the clay ground it was still growing vigorously. It also flourished on the hills. He felt sure it would do well on the local hills country without cultivation. *Melilotus* (King's Island Clover) he found did well on cultivated soil, but would not grow where the land was uncultivated.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, September 19.

PRESENT.—Messrs. Burton (chair), A. Bartrum, Jacobi, A. and W. Petrie, Curtin Ryan, Woolford, Frydd, Hamilton, Thyer, Cox, Murphy, F. Bartrum (Hon. Sec.), and one visitor.

COLT-BREAKING.—A short paper on handling young horses was read by Mr. Jacobi. He considered a horse should be left till at least three years of age before being worked. He should then be caught in the spring, when fat and strong. The first task was to teach him to stand tied up. A wheat bag should be placed round his neck to make a wide band and the rope fastened to it. The rope was fastened to a strong post and the animal taught to submit to being handled, particularly about the head. After this, an open-headstall, a surcingle, and a crupper was put on, and the head reined back by degrees until the chin touched the chest—this to teach the horse to carry his head down with the neck curved when being ridden or driven. A draught horse only needed to be reined back far enough to give a mouth. The horse should then be run round in a circle, first from the near side and then the off, at the same time having him slightly reined on the opposite side. A good rider should now mount the animal, and it was important that the first rider should not be thrown. To avoid damaging the horse in case of a fall it was a good plan to ride over some soft ploughing. A whip should never be used. Horses broken in this manner would stand tied with a piece of string and would answer to either rein. Members agreed generally with the views expressed, but added that the crushpen was necessary for handling wild colts.

Brinkworth, October 22.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. Brinkworth (chair), Hawker, Krieg, Stott, and Hill (Hon. Sec.).

FENCING.—Discussion on fencing took place. Mr. Hawker considered the best fence to make was one with posts 30ft. apart, putting two iron droppers between and one barbed wire along the top. The Chairman agreed as to posts and droppers, but preferred the two top wires to be barbed. This was very effective in preventing cattle from reaching through or crawling under. It was agreed that a good ring fence should be put round the farm, and that substantial iron gates were much to be preferred to barbed-wire make-shifts across the openings.

Georgetown, October 22.

(Average annual rainfall, 18 in.)

PRESENT.—Messrs. W. Hill (chair), P. T. Hill, Inglis, P. and J. Higgins, King, W. and A. Thomson, Myatt, Eyre (Hon. Sec.), and three visitors.

VEGETABLE GROWING.—The following paper was read by Mr. Inglis:—"It is rather rare to find a farmer who has a taste for gardening, and the patch of garden attached to a farm is usually attended to only when the men have time to spare from more important duties. As a rule the farmer looks upon gardening as a wasteful pursuit; and, accustomed as he is to regard the cultivation of the soil as a purely commercial matter, he cannot see sense or reason in devoting time, attention, and money to the decoration of a piece of ground that will neither fatten the cattle nor fill the barn; not that his eye is closed to the beautiful in nature, but only useful beauty will win his genuine admiration. In cropping the vegetable garden a safe and general rule may be followed—a rule well understood by farmers—that plants grown for their roots and plants grown for their seeds may follow each other in succession. For example, potatoes may be followed by cabbage. It is a pity that so many farmers keep to the eternal potato and cabbage, as if nothing else was fit either to grow or to eat. They are first-rate vegetables; but are not cauliflowers, peas, lettuce, and beans also worth cultivating? By a little attention to these details a farmer may have his table supplied with a variety of vegetables nearly all the year round. The first thing to do is to select the best piece of ground close by the house, then cart as much stable manure, or cow manure if obtainable, that can be well dug in. If sand is easily procured a good coating on the top of the digging helps the plants and also keeps the ground from cracking. Cauliflowers should be put in about the end of March up till May, but later than that in this district is not much use, as they soon run to seed. Cabbage, lettuce, turnips, and radish can be planted from March until the end of August. It is a bad plan to sow too much of one sort at a time—little and often is the best. Red beet is a vegetable that can be grown all the spring and makes fine pickles. It needs very loose soil. Rhubarb can be grown in the North. It needs plenty of manure and water. A dozen plants well looked after would keep the house going for a considerable time. Last year I bought no cabbage, cauliflower, or lettuce from the beginning of July until after harvest, and always had vegetables for dinner. Most of the farmers have water laid on from wells, and with a little time and energy they could improve the surroundings of the home and make it look as though someone were living there."

THE FARMER'S DIARY.—A paper on this subject was read by Mr. Hill, as follows:—"A daily account of work done on the farm, garden, or station has proved of great service to the person keeping it. Lord Bacon truly declared that 'Writing makes an exact man.' It also removes the need of taxing the memory when, at the expense of a quarter of an hour per week, a man may keep a diary which will prove of immense benefit for reference as years go by. Most farmers have had both success and failures in cultivation. Probably a short, careful memorandum showing when and how such crops were planted, what was the condition of weather and soil before planting, and what special changes of weather followed in each case would be a help to discover mistakes made. The same applies to stock. Immense benefit follows the keeping of a diary if the work be carefully and thoughtfully done. The simplest and most effective method is to write the date and what has been done on the left side of the book, with particulars which may seem of use for future reference, leaving the opposite side vacant for recording the results, whether of a crop sown, a flock or a herd purchased, or any similar transaction; and on the right hand side opposite make records of results. When such a record has been kept future action is simple. If the work done has been a success the record stands to show how it was done. If it was a crop sown, and time, method of operation, depth of ploughing, quantity and kind of super. used, &c., shown—no better future guide could be obtained. Should the result be a failure, or a partial failure, errors could be detected. Thus a man

becomes a practised, keen critic of his own work and to his own profit. The man's observation is ever being cultivated. Should he be a member of a bureau he will benefit others. Every farmer, grazier, or dealer in stock who once begins a diary must be convinced of its benefit, and would never again give it up. He would have at least a weekly record of his most important doings, and not simply record a few dates upon stable doors re brood mares, &c. Entries would be regular, short, but complete." Members were generally in favor of keeping a diary.

Narridy, October 1.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. Haren (chair), Satchell, H. H. and W. F. Nicholls, Nicholson, Lehmann, Liddle, and Kelly (Hon. Sec.).

IMPROVEMENT OF SEED WHEAT.—Discussion took place on the improvement of seed wheat by selection, following on a report of the address given upon this subject by the Assistant Director of Agriculture (Mr. A. E. V. Richardson, B.A., B.Sc.). Members were inclined to put into practice the suggestions made in regard to selecting seed. They regarded the address as intensely practical and of great value to enterprising farmers.

Narridy, October 15.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. Haren (chair), Lang, W. F., H. H., and H. Nicholls, Satchell, Kelly (Hon. Sec.), and four visitors.

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. H. Nicholls, and the opportunity was taken to inspect the departmental experimental plots. An acre plot of Comeback was out in ear and looked well. A few patches of takeall were to be seen. Similar plots of Federation and Yandilla King were not so forward. In these red rust was visible, and also flag smut. The fourth plot was an acre of Huguenot. It looked well—a very thick crop. Members considered a bushel to the acre too much to sow of this variety. An acre of Bunyip looked best of all. Being an early variety, it was well forward. A private plot of Gluyas grown from selected seed from Roseworthy College looked well out in ear, but there was a lot of late wheat in it, and also some barley. Members thought this poor encouragement to farmers to buy Roseworthy seed at a high price. The Hon. Secretary had a crop of the same variety with which this crop could not compare for purity of seed. Three acres of King's Red was a nice crop, well headed, very clean, with a good solid straw. A plot of Carmichael's Eclipse also looked well. Members were then entertained by Mr. Nicholls and family, who were heartily thanked for their hospitality.

Port Pirie, October 1.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Munday (chair), Greig, Welch, Teague, Hawkins, Jose, Birks, Eagle, and Wright (Hon. Sec.).

ROTATION OF CROPS.—Further discussion on this subject, which was introduced at the previous meeting, took place. Mr. Birks said it was a mistake to sow rape and barley together, as stock would not eat the former until the latter was consumed. Rape grew much stronger if sown by itself, and was not so easily trampled down as when mixed with barley. He thought the deep-rooting of the rape benefited the soil for a succeeding wheat crop. Mr. Munday agreed that to get the best results these crops should be sown separately.

CONGRESS NOTES.—Mr. Birks having reported on the proceedings of Congress, expressed the opinion that it would be an improvement if at these gatherings more time were devoted to addresses by the experts and officers of the department.

WHEAT DISEASE.—Mr. Hawkins reported that a smut of some kind had appeared in his crop just as the plants were coming into ear. He wished to know what it was. [If samples of troubles of this kind are forwarded to the department some information might be supplied, but in the absence of any of the diseased heads it is impossible to say with any degree of certainty what the disease is.—ED.]

Whyte-Yarcowie, October 22.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Look (chair), A. and F. Mitchell, Walsh, Hunt, McCann, (i. and D. Mudge, Ward, Pearce, McLeod, Jenkins (Hon. Sec.), and one visitor.

NOXIOUS WEEDS.—Discussion on the eradication of noxious weeds was introduced by Mr. Mitchell. Considerable warmth was displayed, members generally agreeing that the Act for the control of those weeds should be more strictly enforced. It was resolved to ask the local district council to strictly enforce the Act on private property and railway land alike. It was also decided to ask the Advisory Board to urge upon other Branches of the Bureau the necessity of agitating to have the Act strictly enforced.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, October 15.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Wishart (chair), Swann, Sibley, Thorne, Giles, Friend, Player, Matthews (Hon. Sec.), Block (Freeling Branch), and two visitors.

HOMESTEAD MEETING.—This meeting was held at the home of Mr. Swann, whose vineyard and garden were much admired.

PROBLEMS OF FARM LABOR.—Mr. G. A. Block, Hon. Secretary of the Freeling Branch, attended and read his paper on this subject. It will be found printed on page 81 of the August issue. After the paper had been read a general discussion ensued. Mr. Swann agreed that many servants were housed in tenements that were unfit for habitation and were a disgrace to the owners of the properties. There were places he had seen that ought to be pulled down and more commodious premises erected for employes, and he agreed that if men were better treated on homesteads there would be less trouble and more contentment amongst rural labor. Each member present spoke, and the general feeling was that more agricultural labor should be brought out from the older countries. Mr. Matthews thought that the question of what to do with useless and worthless laborers was a problem that would have to be faced. Mr. and Mrs. Swann were heartily thanked for their kind reception of members, and Mr. Block for having come from Freeling to address the meeting.

Freeling, October 14.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Neldner (chair), Koch, Kleinig, A. Mattiske, sen. and jun., Heinrich, A. H. Mattiske, E. H. Koch, Steinfeldt, Block (Hon. Sec.), and three visitors.

PREPARATION OF HAY FOR MARKET.—Mr. Kleinig read an interesting and instructive paper on this subject which will be found on page 343 of this issue.

Nantawarra, September 23.

(Average annual rainfall, 15 in.)

PRESENT.—Messrs. Sutton (chair), Dall, Dixon, Herbert, Nicholls, Sleep, Smith, Sinclair, Gosden (Hon. Sec.), and one visitor.

PROBLEMS OF LAMB-RAISING.—Speaking of lamb-raising Mr. Nicholls said farmers should lay themselves out to breed and rear the very best class of lambs for export. It was possible to produce very fine lambs by careful cross-breeding and proper attention. Mr. Sleep mentioned that big crossbred lambs realised slightly less per pound than smaller lambs. Members were divided in opinion as to whether early or late lambs were better for export purposes. There was always a chance of early lambs receiving a setback and never fully regaining their proper condition. They also were liable to become too fully grown before being required for export. Mr. Dall thought Merino lambs dropped in the

first week in June were best. In reply to a question Mr. Nicholls said that if farmers consistently exported lambs the return would be better than that from selling privately. Several members supplied copies of their transactions with firms dealing in the lamb export trade, and by comparison it appeared that the Government Produce Depot charge for slaughtering and complete handling was one-sixteenth of a penny per pound more than that of a private firm. Mr. Nicholls wished to know whether prior consideration was given by the Government Produce Depot to the dealer with 5,000 lambs as against the producer with 200. [Exactly the same treatment is given to the man with 200 lambs as with 5,000, and the same charge per pound made.—Ed.] *Truck Difficulties*.—Mr. Sutton complained that he had taken lambs to Bowman's to truck them, but no trucks were available. This was very unsatisfactory.

DRENCHING STOCK.—At the previous meeting Mr. Herbert said he had found a canvas bag, bucket-shaped, fitted with 4ft. or 5ft. of $\frac{3}{4}$ in. rubber hose from the bottom, a convenient contrivance for drenching horses. The bag of physic was suspended overhead and the hose was attached to a wooden rod, and thus inserted into the animal's mouth.

Saddleworth, October 21.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. Frost (chair), Eckermann, Rex, Graham, Manning, and Coleman (Hon. Sec.).

CONGRESS.—Having delivered his report of Congress as a delegate, the Hon. Secretary said that the practice of securing the services of the agricultural experts on these occasions was highly commendable. They had greater opportunities and a much wider range of experience from which to draw than the ordinary farmer.

IMPROVEMENT OF SEED WHEAT.—A suggestion was received from the Acting Secretary to the Minister of Agriculture that this Branch and the local Agricultural Society should take up the matter of improvement of yields by selection of seed from the best heads on the lines advocated by Mr. A. E. V. Richardson, B.A., B.Sc., at the Congress. Members spoke in terms of hearty approval, and steps were immediately taken to have circulars printed and distributed throughout the district, so that the first selection could be made during the coming harvest. Members thought that while the results during the first year or two might not be very noticeable, if the practice was continued the results would amply repay time and trouble taken, and as a Branch they heartily indorsed the scheme.

ROSEWORTHY COLLEGE.—The Hon. Secretary advised members to arrange with the Principal of the College for a Branch visit, instead of going on "Farmers' Day," when there was such a large number. The Branch decided to do this.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Arthurton, October 14.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. S. L. Lamshed (chair), Williams, Rowe, Howlett, Page, Klein, Westbrook, Lomman, Lamshed, Elix, Short, Stephenson (Hon. Sec.), and one visitor.

TAKEALL.—Mr. Westbrook read a paper on this subject. He was convinced that takeall was not caused by poverty of soil, nor was it entirely due to looseness of soil, although that condition appeared to facilitate the progress of the disease. This he had proved by rolling with a heavy roller a portion of a crop in loose soil. The result was that the disease was not nearly so devastating in the part thus consolidated. He believed that the trouble was caused by small insects; some people called them sandflies. They were to be seen as early as September, but in December and early January were fully grown. His theory was that these flies deposited their eggs on the grain itself, and that this was the source from which the trouble arose in succeeding crops. He strongly advised burning stubble immediately after reaping where takeall had been. He did not consider the advice of the department to grow oats was really a cure. Oats would grow, but

would not be so vigorous on the patches where takeall had been. [The department has never stated that growing oats is a cure for takeall, but that oats may be successfully grown on land which will not produce a crop of wheat free from this disease, and that if the oats are grown for two or three years in succession the fungus responsible for the takeall is starved to death, and afterwards, for a period at least, wheat may be grown in the same soil.—Ed.] He was further of opinion that wheat should not be used for seed which had been taken from a crop affected with this disease. He considered that if this rule was strictly followed up the disease might in time be stamped out. In the discussion which followed Mr. Howlett thought the trouble was caused by insects, and seeding when the soil was dry. He could not agree with Mr. Westbrook that it was useless to grow oats. He had found the takeall worse in light than in heavy soil. Mr. Klein said his neighbor had had takeall in the wheat crop badly after the soil had carried one crop of oats and had been lying in fallow for a season. With him takeall had been worse in heavy than in light soils. Mr. Rowe had a crop this year sown on stubble land, and takeall was showing up badly. On land which last year bore a heavy crop of oats there was this season a good wheat crop, and this confirmed his opinion that the oats were beneficial. Mr. Alpin, a visitor from the Moonta School of Mines, said that as the fungus which caused takeall could not live on oats; instead of reproducing, it died. If the oats were grown long enough the succeeding wheat crop was clean. He advised working the land only when in a moist condition. The Hon. Secretary considered that before long a solution of the problem would be discovered by scientific men, but added that hints of a practical nature were invaluable.

Maitland, October 1.

(Average annual rainfall, 19jin.)

PRESENT.—Messrs. Opie (chair), Bawden, Bentley, Hastings, Heilemann, Hill, Jarrett, and Pitcher (Hon. Sec.).

TAKEALL: CAUSE AND CURE.—The following paper was read by Mr. Hill:—"All South Australian farmers know the great losses caused by red rust; but fortunately we have to some extent overcome that trouble by sowing rust-resisting wheats. I believe it may be possible to produce a wheat which will resist takeall. The best and most profitable method yet known to combat the trouble is to follow a system of rotation of wheat, oats, grazing with sheep, and lastly fallow. By this system we obtain fair profits in three ways, and at the same time the land gains strength and heart for the next wheat crop. If a portion of the oat crop is cut for hay I would sow that portion again with oats and feed off with the stubble. My first sight of takeall was in the early 'fifties on the Adelaide Plains. It appeared after the land had been cropped a few years and in patches every plant died off. The cause was then attributed to thread worms. My first loss in this district over 30 years ago was on well-worked fallow, sown late in April. The crop died off in small patches all over the field. The cause I thought due to too dry a seed bed. The following year I ploughed the field in May, when moist, and had a splendid crop, no sign of disease appearing. Burning stubble will not prevent takeall. One year on scrub land I had a fine crop of wheat destroyed by red rust. I burnt the stubble and sowed the land the following year with wheat, barley, and oats. The wheat and barley were almost totally destroyed by takeall. The oat crop was a splendid one and quite free from disease. In reaping the wheat crop I noticed on the affected patches swarms of sandflies. I thought probably the maggot of the sandfly was the cause of the takeall. A few years before the seed drill came into use I ploughed back my fallow land and sowed it with the broadcast machine and harrowed the seed in. In one instance I caught up to the plough, and sowed the portion not ploughed which was afterwards ploughed in. The result was that which was sown after the plough was patchy, with dead bunches all over it, whereas that which was sown before the plough and turned under was quite free from dead heads right from the furrow line from one end of the field to the other. This goes to show that that which was ploughed under had a firm seed bed, whereas that which was sown after the plough had not, and consequently the roots had to fight their way through hollow space, and the result was root failure and 'take half.' For several years I have been clearing and cropping new scrub land which has yielded from five to six bags to the acre. The second year phosphates have been applied with good results, but the third year takeall has appeared in patches. Last harvest was the fourth year, and I had a fine crop of oats. This has been the case with scrub lands for 25 years—the third year takeall comes along. I would suggest that this and all other Branches of the Bureau, and also Roseworthy College, should co-operate to conduct experiments with the object of producing the kind of wheat that will resist the ravages of the disease

called takeall. I would also suggest that each member of the various Branches and the College should set apart a portion of the land where the crop has failed the previous year through takeall, and plant it in divisions with oats, peas, and various kinds of wheat, and the following year sow the field with the varieties of wheat which have stood the test best." It was considered by one member that while burning the stubble could not be said to prevent takeall, it helped to prepare the soil for a good crop of oats, and then if the oat stubble was burnt the two fires seemed to check the spread of the disease. Fallowing early and working the soil only when there was plenty of moisture at the surface were also said to be practices worth while observing. It was not safe to do more than harrow the land after harvest unless a good fall of rain was experienced. After further discussion the following resolution was passed:—"That this Branch agrees materially with Mr. Hill's paper, and suggests that farmers throughout the State should carry on experiments to endeavor to overcome the takeall disease."

QUESTION BOX.—In answer to a question it was stated that stinkwort was injurious to the soil, inasmuch as it was a vigorous grower and continually robbed the soil of valuable plant food. It was also affirmed that the only way to determine the best wheat for any farmer was by experimenting with different varieties under exactly similar conditions in separate plots. [Harvesting separately, and weighing and recording the results of each.—Ed.]

Pine Forest, September 27.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. Carman (chair), Schultz, McKay, and Barr (Hon. Sec.).

HOMESTEAD MEETING.—This meeting was held at the homestead of the Hon. Secretary. The departmental experimental plots which were being grown by Mr. Barr were inspected and found to be badly affected with takeall. These were sown on well-worked fallow, and, although the crops came up and started well, they began to die back in July. Weeds of all kinds speedily sprang up and filled the gaps in the crop. Other crops in the same field which received the same treatment were looking very well. It was estimated that the experimental plots would only yield half as much per acre as the adjoining crops.

SHORTAGE OF LABOR.—It was considered that on an average one additional man could be profitably employed on every farm in this State.

Pine Forest, October 18.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. Bayne (chair), Schultz, Inkster, Smelt, and Barr (Hon. Sec.).

FARMING ON SMALL CAPITAL.—The Hon. Secretary read Mr. Dall's paper from Congress report on this subject. Considerable discussion followed, and some remarkable accounts of successful men of grit who had made a small beginning were given. These instances were drawn from the early days of scrub-farming in this district, and also from the recent opening up of the Pinnaroo and West Coast lands. Mr. Inkster favored trying second-hand implements and cheap horses at the start to keep down the interest charges. Mr. Schultz was of opinion that the better results to be obtained from the use of up-to-date implements and good cattle would more than make up for interest charges if proper supervision and care were exercised. Everything depended upon the management and favorable seasons at the start.

WESTERN DISTRICT.

Elbow Hill, October 15.

PRESENT.—Messrs. Cooper (chair), Chilman, J. B., E. R., and S. V. Wake, H. W. and L. Wheeler, A. J., W. S., and J. Tilley, Ward, Harvey, Kernic, G. F. Wake (Hon. Sec.), and four visitors.

FARMING IN MALLEE LANDS: HOW TO START.—The following paper on this subject was supplied by Mr. Dunn:—"Presuming that a man has secured his land, the first

thing to attend to is the water supply. A tank should be scooped or thrown out and built up. The limekiln might also be put down in a position where it could afterwards be used as a tank. The stables should be constructed, and for these a ton of iron makes the most durable building, besides putting water into the tank whenever rain falls. Good warm sheds can be constructed with forks and straw, but they need renovating every few years. Those who have tried to do without a stable for the first season have usually paid for the experience through the loss of a horse or two. The situation of the house is very important. For a start I prefer the house as near the centre of the block as possible, to save time with the team, stock, &c. In this way many paddocks may open from near the stables and yards. The house, if possible, should be built of stone. If galvanized-iron is used it is more often than not added to with the same material. I would also leave a belt of scrub around the homestead. Besides being a breakwind it will provide pieces of wood for swings, rails, and sundry other things often required. The scrub may now be rolled down with horses, or if light, it can be broken down with bullocks; 250 acres should be enough for the first season. This should be for three or four months, to ensure a good burn in February, choosing a day with a north wind blowing. Before burning the whole lot a strip one chain wide should be thrown together all round and burnt, the scrub being set alight from the south end, working round the sides until the north is reached. A fair amount of axe-work will be left, but time spent in cutting stumps well is money saved in many ways. A plough of the twin variety, from eight to ten furrows, which can be worked by five horses, is necessary, and should be followed by the seed-drill, with from 40lbs. to 50lbs. of seed. On strong clay lands harrowing will pay handsomely. The selection of seed depends upon the district. A certain amount of Gluyas should be sown for hay, but the farmer would do well to ask his neighbor, who is making a success of wheat-growing, what varieties are most suitable. A plot of rye should be sown for early green feed, and a few bags of oats should find a place for horse-feed during the ensuing season. The fencing must follow, and if three posts can be obtained these should be put in the ground not less than 18in., and 12ft. apart, with a strainer every 40 posts. If netting has to be used it should go from 4in. to 6in. in the ground, and be fastened to the posts with staples. A plain wire should be run through the posts about 3in. above the netting, which should be again fastened by light wire in two places between each post. A barbed wire, about 6in. above the plain one, wired to the posts, stops most stock, and makes a fair boundary fence. This area can afterwards be fenced into three paddocks of 80 acres, quite large enough for stock or working. Before starting again to knock down scrub cut a line through, so as to leave a shelter break of half a chain wide adjoining the paddock just cleared. In this way you will have three or four strips across the block, which will be greatly appreciated by stock as well as helping to stop a fire. It will also help to stop the drift on light lands. Half an acre of garden should be planted at this stage, as where wheat will grow many useful vegetables will thrive during the season. A sty should be constructed for a pig or two. The harvest not being far off a combined harvester will be required, being to the starter the cheapest method of taking off the crop. Although a little more hay will have to be cut than if the stripper was used, the horses will do better and last longer. Get a chaffcutter soon. It is a good plan to sell a portion of the wheat harvest early in the season, more when starting to deliver, and the balance at end of the season. Endeavor to save 30 or 40 bags of wheat for fowls and pigs. This will make the store bill lighter. Purchase with your eyes open, and do not buy an article simply because it is cheap. Locally-bred horses live the longest and stand the most hardship. In the discussion which followed, Mr. E. Wake said he had never lost horses, though he had been without stables. Mr. Cooper considered the best stable for horses was made of forks with a straw roof. The majority of those present thought Gluyas a poor wheat for horses unless it was chaffed. It was also thought unadvisable to leave a strip of scrub, as advocated in the paper, as it was a harbor for vermin, and wheat would not do well within half a chain of it. Mr. Tilley thought it best to clear all the scrub and plant ornamental trees. It was also considered that the stripper was best for the beginner, on account of the cocky chaff. Dams were preferred to tanks.

Green Patch, October 10.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. G. Sinclair (chair), Smith, Howard, Gore, J. and J. T. Sinclair, McFarlane, Whillas, P. S. Sinclair (Hon. Sec.), and two visitors.

MOTIVE POWER FOR FARM WORK.—The following paper on this subject was read by Mr. Whillas:—"The bulk of farm work all the world over is done by animal power, the

reason being that the work is too scattered for the economical application of power from any mechanical prime mover. Some day this, no doubt, will be altered, but the day of homeless farms is a long way off yet. For the stationary farm work it is now recognised that some form of engine is more economical than horses. Mechanisms that constitute the link between natural sources of energy and mechanical power are called prime movers, and those in common use are water-wheels, windmills, steam engines, and gas engines. The most important to the Australian farmer at present are the oil and petrol engines, which are types of the gas engine. It will make this paper much too long to deal with them in detail as I would wish, so that I shall make the oil and petrol engine the subject of a separate paper for another meeting. The water-wheel is of no use to us, there being no natural water power available. Windmills are used practically only for water-pumping, for which purpose they are an ideal prime mover, the cost of the wind being *nil*. Their use for other purposes is difficult owing to the extreme irregularity of the wind. It requires about a 25ft. diameter mill to give out one effective horsepower, with an average breeze of 10 miles per hour. If a windmill's energy could be cheaply stored for use just when wanted windmills would be in much greater use than they are. This has been done for electric-lighting purposes, running a dynamo from the mill and using a storage battery, but with no great success. The varying speeds of the windmill are most unsuitable for dynamo-driving, and storage batteries are costly, wasteful, and heavy. On some farms the natural conditions are such that it may be practical to cheaply store the windmill's energy by pumping water to a high reservoir, the water to be run back and made operate a water turbine to drive the chaffcutter, &c., when required. It would require a good supply of water just below the plant and a steep hill right close to it, upon which a cheap reservoir could be constructed; but it would be necessary to have the reservoir situated so that the total length of pipe required was not more than, say, three or four times the vertical head obtained; otherwise a very large pipe main would be required to keep the water friction from absorbing the bulk of the power, and this would make the cost of the scheme too high. A very large windmill would not be necessary, for the mill could work all the time and the power required would only be perhaps for a few hours per week. Supposing a 50ft. vertical head was possible, 20ft. of which could be below the plant, and total length of pipe 100ft., using a 6in. pipe 30,000galls. per hour would supply about four and a half effective horsepower at the turbine. With 200ft. head and 500ft. length of 3in. pipe 8,000galls. per hour would give about the same power; whereas, putting in a 4in. pipe and running down 12,000galls. per hour would deliver about seven effective horsepower. Under the most favorable conditions the first cost of this scheme would be higher than for an oil engine to do the same work; but when once in it would have many advantages. If properly designed and erected running expenses would be almost *nil*: power would be available at any time by just turning a cock. More than one turbine could be used for different work, as, say, a small one to drive the cream separator or an electric light plant; also it would supply a good high-pressure water service. The term "horsepower" is not a measurement of work, but of rate of work, being 33,000 foot-pounds per minute. It is the unit commonly employed in connection with prime movers. A foot-pound of work is a force of 1lb. acting through a space of 1ft., equivalent to 1lb. weight being lifted 1ft. vertically or 1lb. 2ft. The rate of work of an average farm horse would be under one horsepower, though an extra strong horse might equal it during a short day's work. Nominal horsepower is a vague, out-of-date term of no comparative value for engines of different makes. Indicated horsepower is the power exerted in an engine's cylinder as measured by an indicator, an instrument that draws a diagram showing the pressure on the piston during every point of its stroke. Brake horsepower is the nett useful power delivered by an engine at its driving pulley, and is less the indicated horsepower by the friction loss in the engine. Brake horsepower and indicated horsepower equal the mechanical efficiency of an engine. In purchasing an engine it is the brake horsepower that a farmer must count on. If this is honestly given it means that he is receiving an engine that will supply him with 33,000 foot-pounds of work per minute for every brake horsepower. One maker may test his engines when fixing the brake horsepower under fair running conditions, whilst another may unduly force his engines for the test; but it is improbable that any reliable firm would overstate the power of their engines. With any engine there is a power at which it gives its best fuel economy. This, with due regard to not overstraining, is generally near its maximum power. There is no economy in half-loading any engine; with the oil engine it increases the fuel consumption fully 25 per cent. per foot-pound of work done; so do not buy an engine larger than the work requires. Plenty of surplus power is all right for an agent to talk about—to him it is an increase, but not in fuel consumption. Steam boilers and engines are the most common forms of prime movers,

but for the small intermittent power required on our farms the oil engine has proved more suitable. The first cost of the oil engine is less. They require much less attention, give a lower fire risk, and in many districts a lower fuel cost. The steam plant would give the best economy where more regular and heavier power is wanted, and firewood is plentiful. On large steam-power plants the coal consumption has in some cases been brought as low as 1½lbs. per indicated horsepower hour. This, with coal at 15s. per ton, would cost .1d. (one-tenth of a penny) per indicated horsepower hour. It would be a good oil engine that would run under working conditions for a fuel cost of .7d. (seven-tenths of a penny) per brake horsepower hour.—1½d. is nearer farm practice, I think. The usual portable steam plant used for farm work or the traction engine would probably average a fuel consumption of about 15lbs. of firewood per brake horsepower hour. In a district like this, where good boiler wood is burnt by the thousands of cords to get it out of the way, the fuel cost for a small steam plant should not exceed .7d. (three-tenths of a penny) per brake horsepower hour; but in some districts it would be quite 2d. On small steam plants the attention costs would be fully 1d. per brake horsepower hour. The fuel, that is the fodder, cost for the horses on our farms must be fully 7d. per horsepower hour of actual work done. In new districts it must sometimes be nearer 6d. There can, therefore, be no economy in horse works, even for a small farm, and the man who uses a hand chaffcutter is losing both hard cash and flesh for every turn. For such work as running a circular saw continuously the steam plant would be ahead of the oil engine for the waste wood, and sawdust would supply the fuel instead of its having to be carted away. For heavy irrigation the steam plant should be the most suitable on account of the large body of water available for condensation. No farmer should touch a steam plant unless he has not only cheap firewood, but ample soft feed water, i.e., water that lathers easily like rain water. I can speak from extensive experience on very bad feed water. It means additional plant, higher running costs, and heaps of worry. The loco. type boiler common to agricultural engines requires the best of water. I have seen this class of boiler ruined beyond repair on a three-months' run with water quite fit for human consumption. Should a plant be running on hard feed water it will always pay to put in a cheap galvanized-iron atmospheric condenser. This, if properly designed, will return about 75 per cent. of the fuel. One of the main causes of loss in a steam engine is cylinder condensation. To lessen this in large plants the steam is superheated. Steam pipes are well covered with some non-conductor, the cylinders are steam-jacketed, and the expansion is divided amongst two or more cylinders. On a small plant the most that can be done is to well lap the steam pipe, even if it is only with old bags. Throttling at the engine valve tends to keep the cylinder dry. There is economy in using hot feed water by heating with the exhaust if not required for the boiler draught. There are many other economies to be made in running a steam plant, but it would take too long to go into the matter here. Now, I wish to speculate a little on the probabilities of partly replacing the horse by some form of mechanical prime mover for farm field work. The main conditions of an engine or motor to do this will, I think, be—not too high a first cost; a cheaper running cost, especially in regard to labor; a freedom from serious breakdowns; a general handiness for all classes of the work required; and it must be able to deal with the bulk of the work, both for seeding and harvesting. I think I am safe in saying that the steam traction engine has never yet been a success for ploughing in South Australia, though in England it is a proved success. The reason is due to the system employed, i.e., travelling the traction engine over the paddock with the ploughs attached behind. At two and a half miles per hour on the average wheat paddock it would take with the average steam traction engine fully 75 per cent. of its power to travel the engine. Of course, the slower the speed and the lighter the engine per horsepower the greater proportion of power would there be available at its drawbar; but there is no hope of reducing the weight sufficiently for the steam traction engine to be successfully utilised in this way. The present type of English traction engine leaves little room for further improvements. On a good macadamised road it would take under 25 per cent. of its power to travel the engine at two and a half miles per hour. In a district where wood and water are plentiful for heavy fallowing it should be possible to plough much cheaper than with horses with a large steam traction engine worked on the English system of wire rope haulage. For short, straight power transmissions there is no system can compete with the wire rope for economy, the loss in power being very low; but a steam plant would be of no use for harvesting under Australian conditions. They would never be safe in a ripe wheat paddock. The oil traction engines, or tractors as some makers call them, are built of less than one-quarter weight of the steam per horsepower. It should therefore be practical to use them by travelling over the paddock, drawing the implements behind for both seeding and harvest work. With a 20 or 30 brake horse-

power plant the fuel cost per useful horsepower of work done on the drawbar should not be over 1½d. per hour, if that. With properly designed implements the labor costs should be less than with horses. Of course there is a limit to the reduction of weight with an oil tractor, for if too light it would not be possible to make the wheels grip. The fodder cost for horses is apparently about double the fuel cost of an oil tractor; but against this we have the breeding of young stock and the manure, also the greater handiness of horses for some of the farm work. I have a reliable report on a trial in England of a 35 brake horsepower Marshall oil tractor, in which heavy ploughing was done at a total cost of 3s. per acre, the cost for similar horse-ploughing being given at 10s. per acre. Of course there will no doubt be many difficulties to overcome before any new system of working can be made a success; but it certainly looks on paper as if the oil tractor could be profitably used on large farms. Some of the prosperous, motoring, Lower North farmers should put it to the test. Electric transmission from central power stations could not, I think, compete with oil tractors: the work is too scattered and thin. In conclusion, I would like to say that as we have to sell our products on the world's markets, and compete with other countries whose wages rates are mostly very much under ours, it is absolutely essential that we should take every advantage that engineering science can give us to lessen our working costs." Referring to a paper on the same subject, which was read by Mr. W. Hunt at the recent Congress, Mr. Whillas added—"Mr. Hunt states that the size of the plant will depend upon the size of the paddock. I consider that on small plants the labor costs will be too high for them to pay. He also says that possibly a well-proportioned ploughing engine will last 10 years. If built by a first-class British firm, and if well treated, 30 years or more would be nearer the mark." Considerable discussion followed, and members were agreed that the horse would hold pride of place on the farm for many years to come.

CLOVER.—Mr. McFarlane tabled some very fine *Trifolium subterraneum*. The clover flourished in the poorer land as well as in the rich black soil. Mr. McFarlane is of the opinion that this clover will stand a lot of feeding, and will be a most suitable one for people who have to plant their own grasses. The clover spreads readily here.

GRASS PLOT.—Members visited an experimental grass plot laid down by Mr. J. T. Sinclair for the department. The grasses were planted in July, 1908, and immediately after planting met with exceptionally wet weather, from which they suffered. The land selected was poor yacca country, and out of fifteen varieties planted the following—in order—did the best:—Sheep's burnet, *Trifolium subterraneum* (this stood out easily ahead of the others), lucerne, millet, melilotus. Lucerne did better on a small gravelly rise. There can be no doubt that sheep's burnet is the best in this plot, especially on account of its early growth. It grew equally well in the rich and poor land.

Koppio, October 22.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. G. B. Gardner (chair), Howard, Bennand, Thompson, M. Gardner, Richardson (Hon. Sec.), and one visitor.

GOOD FENCES AND RABBIT DESTRUCTION.—The following paper was read by Mr. (Gardner:—"If these two matters are not attended to there will be lost to the farmer a lot of feed and profit. Rabbit-proof netting is essential, and the 3ft. 6in. x 1½in. mesh is preferable. Where the ground is at all loose, netting should go about 6in. into the ground and be strained to the level of the carrying wire. A wire 18in. from the ground will protect the netting from damage by crawling stock. Posts should be not more than 4yds. apart, and should be 4ft. high. A 12-gauge barbed wire is best for the top. A good fence properly erected will last a long time, whereas a poor one will soon become dilapidated, and have to be put up again after a few years. This has been proved among ourselves. The poison cart is about the best means of killing rabbits on large and rough areas. Pollard and oats mixed with the contents of a tin of S.A.P. or Rival poison with water added, makes a sufficient quantity for a fair day's work. When the ground is full of water it pays to go with dogs over the hills. The dogs will get a fair run after the rabbits, and with the high prices ruling for skins, one may make very fair wages, at the same time having some good sport. Where the burrows are large and the ground not too stumpy or stony, a single plough will do good work. Warrens once ploughed up like this are seldom reopened. In mallee land the burrows are often more than 3ft. and 4ft. deep in stiff clay. It is almost impossible to dig these out or stop them up.

A good plan is to ram the earth in at the mouth of the hole with a crowbar. When the hole is opened repeat the operation, and put in a piece of wire netting about 3ft. square, throw plenty of earth on the netting, and what rabbits cannot get into the burrow the dogs will soon catch. Burrows are seldom opened after this has been done, but it is not much trouble to put the netting over again. The netting can afterwards be used in other places. In a district like this, with so many creeks, it is difficult to keep fences from washing away and making openings for rabbits to come in. In the smaller creeks a strainer post each side with a heavy strut against it and a separate piece of netting across the stream that can be raised or lowered, would help; but where there is a great rush of water and logs and trees come down, it is best to take up the netting when the winter starts, as otherwise it collects leaves and other rubbish, and the force of water behind is bound to carry something away. After the winter is over netting may be put back on the fences. Care should be taken to study the watercourses and have the netting so that the water can get underneath it, and not carry fence and all away or bury it with silt." Commenting on the paper, members generally agreed with Mr. Gardner. Some who had fences crossing streams were convinced that the removal of wire netting during the winter floods was a good plan, as it prevented to some extent the fencing from being carried away.

ANNUAL MEETING.—The Hon. Secretary reported that 11 meetings had been held during the year with an average attendance of over nine members. The following papers were given:—"Care of Hay," "Silos," "Bureau work and Effectiveness," "Providing Food for Stock," "Destruction of Vermin," and "Farm Economy." Extracts and seasonable notes on a number of important subjects were also read and discussed, making this sixth year in the history of the Branch a fairly successful one.

Merghiny, October 6.

PRESENT.—Messrs. Bubner (chair), Talbot, Mulrooney, Schwartz, Barnett, Moody, Doolan, Moore, Bartlett, Lymm, Watson, Chandler, Place, Basham, Symonds (Hon. Sec.), and two visitors.

HAYMAKING.—The Chairman introduced this subject for discussion. The production of hay for the horses was a pressing necessity in new districts such as this, in which a man had to provide his own hay, and very little could be purchased. It was considered that the best time to cut wheat for hay was just after the flower had fallen. If cut before this it lost weight. Oats should be left longer, as if at all on the green side they were bitter. Mr. Bubner thought the best time to cut oats was when the heads were just on the turn, if for home use; but if for market the question of weight had to be taken into consideration. Members liked to have a good percentage of leaf in the hay. Mr. Talbot thought Marshall's or Purple Straw was the best hay wheat for this district. A variety called Solomon's Prolific had also done well here. Mr. Barnett preferred White Tuscan to any other, but it was pointed out that this variety was too late for this district. It was considered that a number of the local farmers left the hay in the paddock too long. In favorable weather the hay should be in the stack a fortnight after it was cut. Mr. Bubner preferred Neuman's Early for hay. Gluyas was good, but tough to cut. Considerable difference of opinion existed as to the best way in which to stook the hay. If cut at the right stage Mr. Barnett would stook it at once. In the event of the weather being threatening, however, he would leave it for a time. He did not believe in round stooks. Stooks should be made four sheaves wide, and should be made by hand. It was a mistake to lay the sheaves flat on the earth, as they could not dry properly in that position. Mr. Bubner would make the stooks three sheaves wide, immediately after the binder. The reaper and binder with the side deliverer was considered the best. Mr. Barnett said the way to deal with a stack that slipped was to chop the sheaves in with a long-handled spade. This was better than wooden beaters. Other members agreed, and it was also thought that square stooks were best. Where thatching was not done straw should be lightly shaken over the stack. It was useless to dump it on.

SMUT AND BLACK RUST.—Mr. Talbot said that smut could be prevented by pickling the seed, but that black rust could not be overcome in this way. [It has been stated by Mr. McAlpine, Vegetable Pathologist of Victoria, that if formalin is used as a pickle for seed wheat it will not only prevent bunt (smut), but will also prevent flag smut, sometimes called black rust.]—Ed.]

Miltalie, September 27.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. Jacobs (chair), W. G. and E. P. Smith, J. A. and M. J. Laffin, J. P., J. W., and E. Story, Ramsey, Howell (Acting Sec.), and three visitors.

CAPONS.—Mr. E. P. Smith read a paper on "Capons." The practice of caponising, he said, was most profitable. By means of this operation roosters, which lived only to eat and fight, were transformed into docile birds, and developed the finest chicken meat in the world. Wherever this meat was obtainable it had first sale, and as people got to know of it, the demand would be very great. He explained the manner in which the operation was performed, and said it did not entail nearly so much suffering on the part of the bird as was brought about by continuous fighting in the yards. The operation could be successfully performed by the average person with a little practice, and not one in a hundred birds need be lost. It was a money-making proposition, and solved the problem of what to do with the large number of cockerels hatched.

Miltalie, October 15.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. J. S. Jacobs (chair), M., C., and R. Searle, Parker, J. P., G. W., J. W., and E. Story, F. and B. Jacobs, J. A. and M. J. Laffin, O'Connor, Ramsey, Hier (Hon. Sec.), and 25 visitors.

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. M. Searle. On making a tour of inspection members observed that their host had profited by past experience, and made splendid provision for the conservation of water. A number of large underground tanks had been constructed, and sheds with iron roofs, so that even the lightest rain would add to the water supply. There were good stables, a chaff-house, a large machinery-shed, and a blacksmith's shop. In these were seen an oil engine, a chaffcutter, farm implements, &c., and a motor buggy. It was evident that breeding horses, cattle, pigs, and poultry received considerable attention from Mr. Searle, and some splendid stock was seen. The crops looked promising. The visitors were entertained to tea, and then the business of the Branch was dealt with.

SELECTION OF SEED WHEAT.—This subject was introduced by Mr. Ramsey, after which the Hon. Secretary described the method of seed selection advocated at Congress. After discussion it was resolved—"That members of this Branch are in favor of reaping wheat for seed when it is dead ripe. Further, that some of the members undertake to try the system of selection of seed outlined by Mr. A. E. V. Richardson, B.A., B.Sc., at Congress."

Mitchell, October 15.

PRESENT.—Messrs. D. Green (chair), McCormack, P. and J. Green, W. and H. W. Gregory, Ness, Miller, Dorward (Hon. Sec.), and two visitors.

DESTRUCTION OF RABBITS.—Mr. H. W. Gregory introduced this subject for discussion. He thought the best way to deal with rabbits in this district was to plough the burrows up in the month of October, using a plough of not more than four furrows, and getting down to as great a depth as possible. At this time of the year a number of young rabbits were killed when ploughing out the burrows. A few days after ploughing he would set wire netting traps at the openings if any had been made. It was also a good plan to reduce the number of rabbits with poison before ploughing up the burrows. Members agreed that the method outlined was effective on suitable land, but that in rough, hilly or stony country it was impracticable to plough as described.

Penong, October 8.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Brook (chair), Kalmár, Farrelly, Grad, Stiggants, G. H., J. B., and J. Oats (Hon. Sec.), and two visitors.

IMPRESSIONS OF THE WEST COAST.—Mr. Grad read a paper under this title. He had been impressed by the lack of knowledge of the possibilities and extent of the West Coast lands on the part of those on the "mainland." Everywhere he had found settlers most

hospitable, and had been struck with the ready manner in which they helped each other and newcomers. Those who had faced the hardships of earlier days, as well as the men and women who still pushed out into the back country, were deserving of every success. He considered there was need of an improvement in communication with Adelaide and in the postal arrangements. The paper then continued—“*Size of Holdings.*—These appear to me to be too large to be thoroughly and satisfactorily worked. A smaller holding of about 2,000 acres thoroughly worked would, in my opinion, be far more profitable. In the subdivision of the holdings into paddocks enough attention does not seem to be paid to the best way to work the farm easily and with a minimum of labor. The fences are often placed at any angle and in any direction. The paddocks often appear to me to be too large to work systematically and well. These are the impressions of a newcomer, and possibly good reasons may be given for the size of the holdings and the paddocks; but, personally, I should cut the blocks into smaller paddocks, say, from 150 acres to 200 acres in each, so arranged that it would be possible to shut off any one or more as desired. This would also facilitate more systematic fallowing. *Water Conservation* appears to me to be one of the most important matters for settlers to deal with, and, from observations made and information gathered, I do not think that quite as much has been done in this direction as might have been or should have been. Water-carting is, at the best, a nuisance, and a tremendous expense is involved in the wear and tear of horses, wagons, harness, tanks, &c., while there is little or nothing to be seen in return. To conserve water I should unhesitatingly say build galvanized-iron sheds in preference to sinking wells. In the former case one is sure of water; in the latter case, even if water is obtained, it often proves to be practically useless. The cost of water-carting for 10 years would go a long way towards building the necessary sheds, saving not only the wear and tear of materials, but allowing the horses and implements to be used to better advantage in other ways. *Rabbits and Wild Dogs.*—It appears to me that efforts to destroy rabbits are too spasmodic to be successful. Systematic methods must be observed and concerted efforts put forth. It is useless for any one settler to try to cope with his rabbits unless his next door neighbor is prepared to do the same. Trapping, poisoning, digging in, &c., should be carried out in a more systematic manner to be of any service to the settler. The poison cart is almost a necessity on a farm, and I think would pay for itself in a very short time. *Stock-breeding.*—It appears to me that not enough attention is paid to this important matter. Too much close or in-breeding takes place. To improve one's stock should be the aim of every farmer, and this can only be done by judicious breeding. To mate indiscriminately is a great mistake and will prove expensive in the end. *Fodder Grasses.*—It seems to me that it would be worth while experimenting to grow grasses, as if a success this would add considerably to the productiveness of the farm. There should be some grasses which would stand the seasons in this district. I have noticed a want of care shown in many instances for implements and buggies. The life of an implement or trap is considerably lengthened by judicious care and treatment.” Mr. Farrelly, in commenting on the paper, thought a better steam service could be arranged by means of Government assistance. He favored the paddocks being about 200 acres or 250 acres in area, as stock could then be fed advantageously. He also favored iron sheds where there were no water runs, so that water could be conserved, but preferred straw sheds for horses, as they were cooler in summer and warmer in winter. A tank should be put down wherever there was a run, as if holding capacity was provided it would be filled. He was under the impression that the stock from horses imported into the district was no better than that which was locally bred. Mr. Murphy thought 2,000 acres was large enough for agricultural purposes and 250 acres large enough for the paddocks. The Chairman had a salt well and mixed the water with fresh water for the horses, and carted fresh water to the well for the sheep. He believed in galvanized-iron sheds on the range for catching water. Mr. Stiggant favored 200-acre paddocks as being suitable for this neighborhood. To destroy rabbits he believed in filling in burrows with the shovel and having dogs to catch the stray ones. In the winter he would use traps for those that were left. It was necessary to be at it all the year round.

Petina, September 26.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Penna (chair), D. T. and I. Kenny, G. A. and G. Newborn, Wharf, Symonds, Keeley, Newland, Howard (Acting Secretary), and several visitors.

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. D. T. Kenny. A complete scheme for the provision of water was inspected. The water was pumped

from a well 70ft. deep through nearly one and a half miles of 1½ in. piping. The mill was a 12ft. Monitor on a 30ft. tower, and the ease with which it worked was surprising, considering that there was a rise of about 50ft. to the south. With a fair wind the mill pumped about 200galls. per hour. The pipe line was laid down with great care, being on a gentle rise all the way. The pipes were supported on wood blocks every few yards. A short distance from the mill was a retention valve to hold the water from flowing back on the pump. To allow for expansion in hot weather there were expansion joints; there were also two block connections to allow for the renewal of burst pipes. Mr. Kenny thought it would have been better to have had one every five chains. Mr. Penna said that if the thread on one of the pipes were screwed back far enough to allow the collar to go back flush with the pipe this would be a simpler and cheaper method of disconnecting, and could be done much more quickly. This was considered to be a good idea. All the pipes were screwed together with white lead on the thread. Mr. Penna considered Stockholm tar far superior to anything else for this, as it never gripped so that it could not be taken off, whereas most substances harden. The tank was situated on a hill near the house and had a capacity of 100galls. (?) From this the pipes were taken underground to the house and yard. Water could be taken to almost every paddock on the property. Near the windmill there was a stone tank overground, with a cement trough built around it. Members considered this a splendid idea, as it kept stock from polluting the water, and the tank threw a shadow on some of the water all through the day, keeping it fairly cool. The crops were looking well. The wheat on early fallow was grassy, and on late fallow clean. Mr. Kenny considers Yandilla King his best yielder, Federation and Silver King coming next. Members saw a piece of fallow which received the following cultivation:—Fallowed in the winter, ploughed lightly before seeding, and harrowed, and finally drilled in with seed and manure. This plot did not look any different from the ordinary fallow. At the homestead shearing was in full swing, good clean fleeces cutting fairly well. Afternoon tea was partaken of and the business of the Branch was transacted.

CLOCK-SPRING PLOUGHS.—Members considered these ploughs were not suitable for this class of country. The Chairman saw one at work on practically clear land, but several of the springs were broken.

POWER FOR FARM WORK.—Two papers on this subject were read. The first was by Mr. Goodhart. Having traced the development of farm appliances and sources of power he described the working of an oil engine. The paper then continued:—"An oil engine can be used on a farm for chaff-cutting, wheat-cleaning, water-pumping, shearing, butter-making, wood-cutting, and many other purposes. Cheapness of working is one of their great advantages. A seven and a half horsepower engine will work eight hours on a little less than a tin of kerosine. In one hour, with a nine and a half horsepower and No. 4 cutter, 2 tons of chaff can be cut, requiring two men and consuming 6d. worth of kerosine and oil, and in two hours 6 tons of firewood could be cut into foot lengths, requiring two men and 1s. for kerosine and oil. For ordinary farm use a seven and a half horsepower engine is the most useful. This will work a No. 5 cutter, 28in. saw, or lift water 200ft. at the rate of 3,000galls. per hour by means of a 4in. double-action pump. I think the time is not far off when we shall see petrol engines doing most of the work on our farms, even taking the place of the horse for harvesters, strippers, and other machines. They are already used with great success for general work. Motor bikes are simply strapped to a frame and used for running churns, shears, and other light machines by means of a belt. Motor winnowing machines clean between 200 and 300 bags of wheat in a day, and are giving satisfaction. I should not altogether advise a farmer in these parts to get a motor unless he has some knowledge of them. They are apt to stick one up in simple places where an inexperienced man would not know where to look for the trouble. To send for an expert would cause delay. Motors are more complicated than the oil engine. Much of the trouble is caused by the electrical apparatus which explodes the charge. In the single-cylinder motor, as in the oil engines, there is one working stroke to two revolutions. Owing to the introduction of motor traction engines a great deal of labor has been done away with in England. Times like these, when labor is scarce and horses dear, should be opportune for engineers to come forward and show us some trials of motor-driven ploughs, strippers, and harvesters. I am sure the farmers would follow them up enthusiastically if successful, as a man would save much time and labor by doing away with horses." Mr. Howard's paper read as follows:—"For driving stationary machinery the windmill is the cheapest source of power, but it is out of the question on a farm except for pumping water. A mill with a 25ft. wheel working in a wind of 16 miles an hour gives less than one and a half brake horsepower, and that for only an average of eight hours in 24. For water-lifting, so long as the mill

is not overloaded, it cannot be beaten. The oil engine is now found on many farms, but I think it is only suitable where a large amount of work is done. The cost is against it. I think the motor is the ideal source of farm power: it is small and cheap, and can be started at a moment's notice, and with proper treatment will last a long time. A well-designed motor can be moved about on a farm without much trouble, and there are very few uses to which it cannot be put. Some farmers cut chaff, grind corn, &c., using for power the motor winnower, the engine not being removed from the machine. This is a good plan if there is not much to do, but if the engine is wanted for much work it will pay to remove it from the winnower and place it on a good solid stand. Great care should be taken not to give a motor a greater load than it is designed for. Steampower is not suitable on a farm, its initial cost is large, and too much time is lost in getting up steam. Portable steam engines are used with success in well-watered districts for driving threshers, but the average farmer is best without them. Horseworks are doomed, and motors are taking their place. For traction purposes the horse team rules, but I think the large team will be rare in another 10 or 12 years if the prices of horses keep up to its present level. The steam tractor has been tried, but is only successful in well-drained, flat land with plenty of water and fuel handy. Few farmers order a second engine. I think the engine of the future is the oil tractor. This will carry enough fuel and water for a day's run, is easily handled, and is much lighter and cheaper than a steam tractor. If designed to use crude or residual oil this power is very cheap. The motor tractor has come into favor, but I do not think it is so durable as the oil tractor on account of the greater speed of the working parts. The motor tractor used at Roseworthy was not a success for hauling purposes, its failure being due to an inefficient radiator; consequently the engine became heated. This required the water tank to be emptied and refilled with cold water after an hour's run. This operation occupied 20 minutes. As a mechanic was employed, its failure could hardly be due to the driver. Messrs. J. and P. Hackett, Werribee, Victoria, have a 20 horsepower I.H.C. gasoline tractor. It started work at 7.7 on Monday morning, August 1st, and finished at 4.7 p.m. on Saturday, August 6th. During the whole 129 hours the engine did not stop for an instant day or night. It finished in good order without a bearing being heated. The engine drew one four-furrow and one five-furrow disc plough. I think that if the motor continues to be improved, and the prices of horses continues at the present rate, the time is not far distant when the majority of our badly watered country will be ploughed by motor power."

BLUESTONE FOR PURIFYING WATER.—Mr. Newbone wished to know what proportion of bluestone to add to water to purify it. [Various strengths have been used with success. Where there are no fish which it is desired to keep alive, one part of bluestone may be added to 1,000,000 parts of water, i.e., 1lb. bluestone to 100,000galls. water. This will be quite harmless to stock and human beings.—Ed.]

Petina, October 15.

(Average annual rainfall. 12½in.)

PRESENT.—Messrs. Penna (chair), D. T. & I. Kenny, Newbon, Wharf, Bascomb, Goodhardt, Doley (Hon. Sec.), and three visitors.

HOMESTEAD MEETING.—This meeting was held at the home of Mr. Wharf, who, with Mrs. Wharf, entertained members and visitors.

PREPARATION OF SEED BED.—The following paper on this subject was read and discussed:—"The land should be ploughed for the next year's crop some time between the beginning of July and the end of September to a depth of about 5in. for the average Petina soil, which is naturally loose. The flats, which are more clayey and therefore harder, should be ploughed 6in. deep. Deeper ploughing than this would only bring unsuitable soil of a limestone nature to the surface. In October, or at the latest November, the ploughed land should be harrowed, for two reasons—to destroy all weeds that may have germinated, and to form a loose surface mulch to prevent the moisture from rising and evaporating. If weeds should appear after a thunderstorm, which is not infrequent in this district, the land should be again harrowed. This would remove any chance of the trouble with buckbush—a plant which has often caused trouble while drilling. The first 3in. of soil should be kept loose and friable; the next 2in. should be broken by the plough, but be as compact as possible, with few air spaces. This is to enable the roots to strike at once into a suitable soil. To get this compactness is a difficulty, but the previous harrowing will assist in this. I believe, however, that an implement known as the sub-packer would be a great benefit in this country, but it has

never yet been tried here. [The sub-packer has given very good results at Hammond when used immediately after ploughing; the average increased yield for two years over plots not sub-packed was 4bush. per acre.—Ed.] The seed should be drilled in to a depth of about 3in. —that is, immediately between the loose surface soil and the more compact soil below. In order to keep the crop perfectly free from grass the seed should not be drilled in until after the first rain. If the wheat were drilled in earlier and the rain should be late, the farmer would run the risk of the grain malting." Discussion took place on the general treatment of local soils, and an instance was cited in which 60 acres of scrub was rolled down, but not burnt until the second succeeding season. The shoots were cut back before the scrub was burned, and from that plot of 60 acres more wheat was reaped than from 140 acres which was burned a few months after being rolled and cropped immediately. Other cases mentioned showed that sometimes fallow which was ploughed twice gave better returns than that which was ploughed once, while in some instances the positions were reversed. Mr. Wharf's crop afforded a striking illustration of the value of fallow. A portion of the crop was on soil which had not been fallowed, though in all other respects the treatment had been identical. On the fallow there was a beautiful crop, and on the unfallowed part hardly any wheat at all and a luxuriant growth of grass and weeds. The contrast was so great that one could not realise it without actually seeing it.

Utera Plains, September 24.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Gale (chair), R. and H. Hornhardt, A. and C. Venning, J. and M. Abrook, Haines, Chase, J. and N. Guidera, G. and A. Barber, Lee, Stephens, Pulford, Brenack, Bond, Sinclair, West, Hill, Noughton, Ramsey (Hon. Sec.), and six visitors.

STUMP-JUMP IMPLEMENTS.—(General discussion took place on the value of stump-jump implements to districts such as this. These ploughs and cultivators were such an improvement on their "set" predecessors that cultivation was quite another matter, and much more work could be done in a given time.

Utera Plains, October 15.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Gale (chair), R. and T. Hornhardt, A. and C. Venning, Chase, Hill, Abrook, Holmes, Naughton, Lee, Stephens, Branack, J. and W. Guidera, Haines, Bond, Ramsey (Hon. Sec.), and five visitors.

LABOR PROBLEMS.—Discussing the question of farm labor, members said that there was a sufficient supply of labor to be had, but it was of the wrong material. They would like to see a number of good farm hands introduced into the State.

GREEN MANURE.—Mr. Venning wished to know whether ploughing in a good crop of grass would benefit the succeeding wheat crop more than feeding off the grass with sheep. Members thought the former procedure would be best here, as the grass would help to keep the land from drifting.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, October 14.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Hone (chair), Venning, Allengame, Fidge, Hill, Wall (Hon. Sec.), and one visitor.

FALLOWING.—The Chairman read a paper on this subject. He considered that in this district the land was in the best state for ploughing in August and September, and that those were the months in which to fallow. Grass and weeds were then turned under

before the seeds matured, and clean land was the result. He would not harrow or cultivate the fallow until the early rains of February or March. Then he would harrow first, remove stumps and roots, cut shoots and clear them off, and finally use the cultivator. After this he would harrow again with the first rain and cultivate again before sowing. Each successive working should be at right angles to the last.

Forster, October 15.

(Average annual rainfall, 10½ in.)

PRESENT. MESSRS. J. Searle (chair), Payne, Luxon, H. and R. Whitfield, Purdie, H. Searle, Copp, W. and H. Towill, Hayman, and Sears (Hon. Sec.).

DESTRUCTION OF RABBITS.—This subject was introduced in a paper by Mr. Whitfield. He thought unless more effective efforts were made to kill the rabbits than had been in the past, the matter would soon be a hopeless one. In this immediate neighborhood there were thousands upon thousands of these pests, and yet the farmers only attempted to destroy them during the months of February and March. The warfare against these should be continued throughout the year—trapping them, filling in the burrows, poisoning, and destroying them by every other possible means. Members agreed that everything possible should be done to eradicate these pests.

CARE OF IMPLEMENTS AND HARNESS. In a paper on this subject Mr. Hayman said it paid to take the greatest possible care of machinery, implements, &c. Winnowers should not be left in the paddocks from harvest to harvest. Every farmer should have a good shed, and all vehicles, from the wheelbarrow to the wagon, should be sheltered in it. It should also be big enough to allow odd jobs to be done under its shelter in wet weather. It should be equipped with a box for paints, oil, nuts, bolts, and wedges. All woodwork should be painted at least once in five years. He found it most satisfactory to mix his own paint, as he was then sure that the ingredients would be effective in preserving his implements. Wood should be treated with a coat of priming made up of three parts of white and one part red lead, with equal parts of oil and turpentine and a little patent dryers. For ironwork he would suggest oxide paint, mixed with terribin and boiled oil, as this sets harder and lasts longer than other paints. Implements should be cleaned and repairs effected at the close of each season, and all wearing parts wiped over with linseed oil, to prevent them from rusting when not in use. Harness should be well oiled once in three months, and where appearances had not to be studied, boiled oil and blacklead made a good dressing. For buggy and light harness Russian tallow was the best grease, after which ordinary composition could be used.

Parrakie, October 1.

PRESENT.—MESSRS. Dayman (chair), Threadgold, Heinzl, Sowettz, Beclitz, Gravestock, Willis, McLean, Dienar, Ferme, Burton (Hon. Sec.), and one visitor.

COWS FOR THE FARM.—Discussion on this subject was introduced by Mr. McLean. The most profitable breed for the farmer, he thought, was the Holstein or Shorthorn. These had big frames, were heavy milkers, and gave good cream. The Jersey breed he considered only suitable as a family cow for butter. A good crossbred would be Holstein-Shorthorn. Calves from good milkers should be selected and reared for the future milking stock. Selection should be continually going on. Some members favored the Shorthorn for general farm use, but, unfortunately, the majority of those present took no part in the discussion.

Sherlock, September 24.

(Average annual rainfall, 15 in.)

PRESENT.—MESSRS. Whyatt (chair), Osborn, Nock, Nicksch, Hensel, J. P., A. E., and C. E. Tonkin, Coombe (Hon. Sec.), and three visitors.

FARMING WITH SMALL CAPITAL.—Mr. Dall's paper on this subject, which was read at Congress, was considered and discussed. Members agreed with the writer, that a man might commence farming with only a few hundred pounds, but thought that in starting with only £100 the result would depend entirely upon the qualities of the man.

Sherlock, October 22.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Whyatt (chair), V. A. and C. J. Osborn, Wood, Arbon, Stringer, J. P., C. E., and A. E. Tonkin, Coombe (Hon. Sec.), and nine visitors.

FARMING: A COMPARISON OF METHODS.—The following paper was read by Mr. C. E. Tonkin:—"The up-to-date farmer in the North has his property divided into paddocks with substantial fencing, to make it convenient for working. For fallow he ploughs to a depth of about 4½ in., and for this depth of working two horses to the furrow are needed in many of the Northern soils. The land receives a lighter cultivation in the spring and again in summer, if possible after a good rain. In parts of the North there are a variety of summer weeds to cope with. Various types of cultivators are used. The disc implements are popular on some farms, while in other parts the paring-ploughs are preferred, according to the nature of the soils. Great care is taken to keep the ground clean. At seeding time the soil is loosened with a light cultivator and immediately followed with the drill. The phosphate dressing varies from about ½ cwt. to 1½ cwt. per acre—the average being about 75 lbs. When the crop intended for hay is nicely up it is rolled. On most farms a two years' supply of hay is kept on hand. It is cut with a binder, as practical farmers find this the most profitable method. The greater part of this hay is chaffed before being fed to the horses. Many of the chaffcutters are driven by engine power, which is much better than horse power. The wheat harvest is mostly taken off with combined harvesters. The following year this land is left out for grazing. Sheep are found to be a great help in cleaning the ground, and they also help to make up the profits of the farm. So far the farmer in this district does not cultivate his land up to the standard of the farmer of the North. He has not the convenience for doing so. Better cultivation will be sure to make a vast difference to the yield here, as it has in other parts. To ensure these results it is necessary to turn attention to the clearing of the major portion of the land, to provide paddocks for fallowing, cropping, and grazing. The Northern mode of cultivation should be suitable for this district, and our rainfall will compare favorably with that of the North. The farmer should cut a sufficient supply of hay for his own requirements. For taking off the wheat harvest the damp-weather stripper is preferable to the harvester, on account of the growth of the mallee shoots and the unevenness of the ground during the first few years. Before going in for grazing extensively it is necessary to substantially fence the holdings." A good general discussion ensued.

Sutherland, September 17.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Snell (chair), Thiele, Noack, Byrnes, Dohnt, Doecke, Broadbent, Geyer, Mibus, Heusler, E. and A. M. Twartz (Hon. Sec.), and two visitors.

MIXED FARMING.—This subject was introduced in a paper by Mr. Geyer. He was of opinion that all farmers in this district should go in for a mixed class of production. Spare feed could well be fed to sheep and horses instead of being allowed to waste. While the holding should be reasonably stocked it should not be overstocked or loss would result. The price of horses made breeding a very profitable undertaking, and there was every prospect of the high prices holding for some time. Sufficient dairy stock for the needs of the household, with perhaps some butter to sell, should find a place on every farm; but if many cows were kept they would be found to be a great tie and to cause a lot of work. The average farmer should have about 200 ewes and breed lambs for market. Just as many poultry and pigs as could be well looked after and properly fed would be profitable, but it was better to keep a limited number of birds and animals than to have such a number as to cause neglect of details. Members agreed generally with the views expressed in the paper. The Chairman said that if farmers had gone in for mixed farming years ago in this district very much less hardship would have resulted in the bad years. It was also said that if a few poultry could be profitably kept larger numbers could be made to pay with proper care and attention.

A WIRY CALF.—Mr. Heusler reported that a young calf, having had its mother's milk only one day, was lost in the bush. On the eleventh day it was found and was still alive.

Sutherland, October 15.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Snell (chair), Broadbent, Doecke, Heusler, Mibus, Geyer, Byrnes, Noack, Twartz (Hon. Sec.), and two visitors.

ESSENTIALS IN SHEEP-BREEDING.—Under this title the Hon. Secretary read the following paper:—"A succession of favorable seasons, of capital prices for all produce, and

a consequent abundance of cash have done much to arouse a spirit of enthusiasm among the small flockowners in this State. Scores of them have attempted to bring about permanent improvements in their flocks, and several have already met with an appreciable measure of success. The secret of permanent improvements in any flock belongs rather to the man at the head of it than to an indiscriminate expenditure of cash upon fresh blood. Too frequently, where attempts have been made to establish some improvement, it has been through the purchase of a ram or two from some fashionable flock, regardless of suitability. The owner must know what particular improvements he wants to effect, and employ only such rams as possess marked evidence of the qualities to be strengthened in the progeny. Many a ram, on close examination, will be found sunken in the wither and narrow-chested, though to all outward appearance there is no such weakness. It is impossible to judge a ram of any age by simply glancing him over. The ram is too important a factor for a flockowner to employ its service without the most thorough examination. The secret of successful sheep-breeding is the gradual fixing of characteristics that improve utility. Improved blood is introduced into a flock for the express purpose of increasing the selling price of something. In the case of the Merino it is expected from the wool, and in the British breeds from the carcass. There is a farmer not more than 100 miles north of Adelaide who keeps a large flock of breeding ewes, and pays strict attention to raising lambs for the export trade. This man keeps only large-framed Merino ewes, northern bred, and uses Shropshire rams. The great feature of his flock is the uniformity of his breeding ewes. The object this farmer had in view was a uniform lot of lambs fit to go to market when mature and command top prices from exporters. He invariably commands top prices, and it is easy to see that his success is due to his having a well-defined purpose. Another farmer whom I know does not confine himself to any particular type or breed of sheep, but gets his rams as cheaply as possible. It is doubtful whether two individuals in his flock could be selected that would give any evidence of similar breeding. It was very noticeable that the larger number of these ewes could not have carried much wool or have yielded much profit from this source at shearing time. The lambing was also unsatisfactory, partly on account of quality and partly by reason of the time lambled. These two farmers furnish excellent examples of distinct types of flockowners, one making a grand success of his sheep and the other more or less a failure. No flockowner can attain success in the breeding of lambs for market or of sheep for wool who constantly chops and changes with no definite purpose in view. The man who takes up sheep-raising, either as a speciality or as an adjunct to his farm operations, should decide upon his aim, whether wool, carcass, or lamb production, and keep at it. Success depends more upon skilful management than on any other one thing. In the discussion which followed it was said that there were some very inferior rams in this district which should not be used for breeding purposes. To breed export lambs the large-framed Merino ewes were recommended with Shropshire rams.

Wilkawatt, September 21.

PRESENT.—MESSRS. Bowman (chair), T., C., and T. Sorrell, sen., H and O. Arhns, Altus, Brooker, Neville, Harvey (Hon. Sec.), and two visitors.

MISCELLANEOUS MATTERS. — Discussing Congress business, members heartily supported the resolution to subject stallions to registration and veterinary examination. They also were very interested in the subject of improvement of wheat by selection. Discussion took place concerning concrete fence posts, which were thought to be of considerable value where the materials for their construction were obtainable. Mr. Brooker spoke on harrowing growing crops, an operation which was considered by members to be beneficial; but they thought it advisable to sow rather thicker than usual where this was contemplated.

Wilkawatt, October 15.

PRESENT.—MESSRS. W. J. Bowman (chair), D. F. Bowman, J. W., J. E., and A. Altus, Neville, Schulze, Phillips, Arhns, Harvey (Hon. Sec.), and four visitors.

HAYMAKING.—The following paper, dealing with the best time to cut hay, was written by Mr. Arhns:—"In my opinion, the best time to cut hay is when it is getting white up to the third knot. This will give a good green color and a fair quantity of grain. In this class of country a binder should be used, as there is too much rubbish to work the mower and rake. Hay should be stooked as soon as possible. I think it a great mistake to leave it lying in the sun to dry. If stooked the grain will ripen slowly, and the

slower the hay dries the better the quality will be. I make round stooks of about 25 or 30 sheaves. These will receive very little damage from a shower of rain. Fourteen days is necessary as a rule to dry the hay in the stook; after this it can be stacked." Members agreed generally. They thought it best to cut hay after the flower had begun to fall.

STORING WHEAT WITH MERCHANTS.—The Chairman said he considered it a mistake to store wheat with merchants. The wheat gained in weight while stored, and the farmer might just as well have the benefit of that increased weight. He stated that some merchants would not give full market value when the farmers wanted to sell.

ANNUAL REPORT.—The Hon. Secretary presented the first annual report of the Branch. There had been an average attendance of 14 members and two visitors. Thirteen papers had been read and discussed. He appealed to members to continue the keen interest displayed heretofore in the interests of the Branch, so that, if possible, the first year's excellent achievements might be surpassed.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, October 13.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Stone (chair), T. and A. Jacobs, Brumby, Chapman, J. and C. Lewis, Kayser, Curnow (Hon. Sec.), and one visitor.

QUESTION DAY.—This meeting was devoted to answering questions as follows:—
Raspberry Suckers.—Mr. T. Jacobs asked how to deal with a plot of raspberries in which the suckers were very difficult to control. The Hon. Secretary advised the selection of four or five of the best canes growing fairly close together to make clumps, say, 4ft. or 5ft. apart with 3ft. in the rows. All others to be rooted out, and they would have to be chopped up several times during the growing season. **Lice on Pigs.**—To get rid of lice on pigs Mr. T. Jacobs used a weak kerosine wash with success, and also used insectibane. Mr. Kayser had found keroil most useful for this trouble. **Pumpkin Beetle.**—Mr. C. Lewis asked how to deal with the pumpkin beetle. This pest attacked the female flowers more often than the others. He used insectibane with considerable success. The Hon. Secretary thought spraying with an arsenite of lead mixture would destroy the pest. Mr. Jacobs had found the most satisfactory way to get rid of the pest was to catch the beetles by hand. **Apricots.**—Mr. G. Hicks asked whether it would hurt apricots to spray whilst in bloom. He was advised to avoid spraying just then if possible. The spray compound would probably prevent the bees from doing their work of pollination in a satisfactory manner, and the fruit would not set so well. The best time was just before the flowers opened. **Worms in Horses.**—Mr. T. Jacobs advised the use of Desmond's worm powders for this trouble. If the horses were turned out on green grass he thought they would rid themselves of the worms. Other members also recommended Desmond's powders, especially for worms of about 6in. or 8in. in length. [The Government Veterinary Surgeon has prescribed for this complaint more than once. A reference to *Journals* a few months back will reveal the best treatment.—Ed.] **Cincturing Pear Trees.**—Mr. A. Jacobs asked how to make a pear tree bear fruit. The Hon. Secretary advised but little pruning and cincturing of either the stem or main arms when in bloom. If the tree would not bloom it should be cinctured in February. Mr. T. Jacobs always cut his trees right into the wood every four or five years, with good results. **Formalin for Potato Seed.**—Mr. Stone sought information on the treatment of seed potatoes with formalin. [This information is given on page 25 of Bulletin No. 49, copies of which were recently forwarded to all Branches in potato-growing districts.—Ed.]

Forest Range, October 13.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. F. Green (chair), H. and A. Green, Waters, Vickers, Pollard, Collins, Tribe, Monks (Hon. Sec.), and one visitor.

BORDEAUX PASTE FOR SPRAYING.—Mr. Vickers initiated a discussion upon spraying with Bordeaux paste. He spoke of the difference between it and the old formula—Bordeaux mixture. He did not think the paste stuck quite as well, and had now tried some

with a little honey mixed with it, and would report how it adhered to the trees later on. Mr. F. Green last year sprayed some Rokewoods with Bordeaux mixture, and just afterwards rain fell. He found they were just as clean as those sprayed in fine and dry weather. He wished to know whether it was necessary for the Bordeaux mixtures to remain on, or if it was as effective if washed off soon afterwards. [The Horticultural Instructor (Mr. Geo. Quinn) replies—“Mr. Spencer Pickering, M.A., F.R.S., Director of Experimental Fruit Farm, Woburn, England, who is now probably the leading authority on Bordeaux mixture in the English-speaking world, explains the action and chemical changes which take place in this compound. The mixture contains a basic sulphate of copper, and the action of the carbonic acid in the air decomposes this basic sulphate, reproducing gradually a certain amount of the ordinary sulphate; and, this being soluble, is able to exercise the fungicidal action characteristic of the copper salts. It seems to have been well established that the fungicidal action of ordinary Bordeaux mixture does not come into play till some time (a week or more) after it has been applied to the plant. This, he explains, is due to the fact that the ordinary Bordeaux mixture prepared with the usual excess of lime contains a considerable amount of basic calcium (lime) sulphate, the compound being really a double basic sulphate of copper and calcium. When this compound is acted on by the carbonic acid of the air the basic calcium sulphate in it is attacked more easily than the basic copper sulphate, and until all the former is converted into carbonate little or none of the basic copper sulphate is attacked (i.e., changed into a fungicidal nature). The Bordeaux mixture that was sprayed on to the Rokewood apple trees could not therefore have been washed off completely. In discussing the occasional scorching noted from the use of Bordeaux mixture, Mr. Pickering says ‘It has long been noticed that under certain weather conditions Bordeaux mixture may cause very appreciable injury. These conditions are the continued presence of moisture sufficient to accelerate the formation of the copper sulphate, but insufficient to wash it from the leaves.’ This may explain why the small quantity of Bordeaux was not washed off, but, though imperceptible to the unaided eyesight, acted so effectively against the fusidadium on the Rokewoods. It may be incidentally mentioned that the greater proportion of the coloring matter, which is so noticeable upon the trees when sprayed with ordinary Bordeaux mixture, consists of lime compounds which are not fungicidal in their action.”—ED.]

TRIP ON THE MURRAY. — Mr. Townsend gave an interesting account of his recent visit to Mildura and Renmark. He considered that, although smaller, Renmark compared very favorably with the Victorian fruit centre higher up the river. He considered the locking of the Murray would be the making of this State.

Hartley, October 19.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Wundersitz (chair), W. and C. Brook, Hudd, Phillips, Paech, Pratt, Symonds, Bermingham (Hon. Sec.), and seven visitors.

HOMESTEAD MEETING.—Members met at the homestead of Messrs. W. and C. Brook, and made a thorough inspection of property and plant. The draught horses were in tip-top condition. The owners had been going in extensively for horse-breeding, as the prices realised during the last few years had made it a most profitable industry. The land not under crop had therefore been used for horse feed, and none of it fallowed. The crops were consequently rather poor as compared with those grown on fallow in the surrounding district. Grass was abundant everywhere, and it was said that the use of bone super. had materially helped to this end. Some good Jersey milkers were seen, and these were also in good trim. The implement and hay sheds, &c., were all that could be desired. The evening was spent in social intercourse and pastimes, and so, thanks to the kindness of the hosts, terminated a very profitable and enjoyable outing.

Kingscote, October 3.

(Average annual rainfall, 18½in.)

PRESENT.—Messrs. Turner (chair), Wallace, Mundy, Jacka, Bell, (Hugwin, Cook, (Hon. Sec.), and one visitor.

CO-OPERATION AMONGST FARMERS.—A paper on this subject was read by Mr. Jacka to the following effect:—“That co-operation on right lines is a good thing most farmers will admit, yet it is not much practised among them, although many of the business

people with whom the farmers deal have their little 'honorable understandings,' &c. The most pressing need for co-operation on Kangaroo Island at present is in the disposal of barley. The present system of dealing with it is very unsatisfactory. The buyers, of whom there are only a few, send their representatives among the growers to obtain from them samples of barley. These they take away, having learned the quantity the growers have to sell. Later on the representatives offer to the first grower they meet a more or less (generally less) satisfactory price for his barley. The latter, fearing that if he refuses the offer he may have difficulty in quitting his barley except at a big reduction, accepts, and thus the standard market price is formed. Why should not the growers 'pool' their barley—making such a parcel that it would be worth buyers from the other States, as well as those in South Australia, competing for the purchase of it. It needs to be well thought out and arranged on sound lines; but I feel sure that a better price would be obtained. If a few farmers would co-operate they could save a good deal on the price of their machines when purchasing. Some implements could be used on several farms. Take, for instance, a grader. A most necessary and useful machine, but expensive. The cost is about 20 guineas, and it is only used a few days by each individual in the year. It would do the work for, say, five farms without being ill-used. If five farmers club together they would not feel the cost, but would be as well served as if each owned a separate grader. A portable engine and chaffcutter comes under the same heading. Now that horses are such a price nearly every farmer is endeavoring to raise a few foals each year. Unless he has a stallion this must cost a good many pounds in the year for service of stallions. If a few farmers were to purchase a stallion a good saving would be effected annually. Most farmers keep a few sheep. These are generally shorn on the premises, and the wool is prepared for market in a more or less rough and ready manner. The demand for wool has been so good of late years that a fair price has been realised; but I think it is only a matter of a few years before nearly all farmers' lots of sheep will be shorn at central depots by machinery on a co-operative system, and the wool classed and baled by experts, at much less than present cost to the farmer. On account of being better shorn and well classed the wool will command a much better price. There are many other ways in which co-operation would be equally beneficial."

PUMPKIN AND MELON GROWING.—A paper on this subject was read by Mr. Turner. A sandy loam was best for these plants. It should have stable manure ploughed in in autumn, at the rate of about 15 tons to 20 tons per acre. Right through to September this land should be worked whenever necessary to kill the weeds, and then should have a dressing of 2cwts. to 3cwts. sulphate of ammonia and 1cwt. of bone super. per acre ploughed in and harrowed down fine. The soil should not be worked when very wet, or it would bake. Pumpkins, squashes, trombones, and melons, &c., should then be planted. Piemelons should not be planted within a mile of the watermelons, or the latter might be spoiled by cross-fertilisation. The beds for trombones and marrows should be 10ft. apart, made by digging patches with a fork. Three to five seeds should be put into each bed, from 1in. to 1½in. deep. Beds for melons should be 6ft. apart. He had found the productiveness of the squash, pumpkin, and marrow improved by nipping off the end of the runners just after the plant had started to bloom well. This caused lateral shoots to be thrown out and quickened the growth of the fruit which had set. Weeds should be kept down throughout, and the soil kept loose to conserve moisture. In this way good fruit could be produced with very little rain during the growing season. He had raised pumpkins 65lbs. in weight, and watermelons up to 32lbs., in a dry summer. The Fordhook squash would keep from the time of gathering till seeding time returned. Mr. Turner exhibited a squash kept in this way. [It is regrettable that no discussion of these two papers is recorded. We cannot undertake to publish papers unless some attempt is made to give the views of members upon the matters brought forward.—Ed.]

Meadows, September 19.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. Brooks (chair), Smith, Morris, Catt, Kleeman, Russell, McDonald, Ellis, and Bertram (Hon. Sec.).

DAIRYING ON 80 TO 100 ACRES.—Mr. Morris read a paper on "Dairying." The most important factor in successful dairying was the selection of a good herd of cows. He preferred a half or three-quarter Jersey cow. Many dairymen disliked this strain because when old they would not bring such high prices for beef as other strains. This was a great mistake, as much more money would be brought in by the better milch cow during the, say, seven years of milk production than the extra price realised for other

breeds when milking days were over. He would buy cows exhibiting characteristics indicative of milk production. Some would doubtless prove to be below the required standard, and these should be culled out and disposed of at the first opportunity. It was better to sell a poor cow at a loss of a pound or two than to keep her and lose a similar sum per annum. The paper continued—"A cow may pick up her own food for about two months in the year while in milk, but when dry I believe in hand-feeding once a day. It is bad policy to have a couple of bails and feed the cows while you milk, and then scatter the green feed or hay in the paddocks. There is too much wasted. Some cows rush the others. Some may be slow eaters, and others which are timid would rather go without than run the risk of being horned. The result is the aggressive cows give the most milk and are considered to be the best. Build a shed, make stalls, and you will know what food you give each cow. Then test each cow for the butter fat she produces. I favor feeding night and morning, but not stalling at night where there is good shelter and a dry camping ground. Give bran and chaff mixed with green feed, mangolds, &c., from April to the end of September. For the last three months of the year you need not feed so heavily. For a part of January, February, and March the cows will be dry. They should have this rest for about 10 weeks, and then come in early in April, to get over calving before the winter sets in. Butter is a good price at this time, and pays well for the feeding involved. The cows will milk well through the winter, and be as good at spring time as if newly calved, as they will be in good condition. A cow in this locality which has been dry, and has not been fed through the winter, and calves at the end of it, takes the best part of the spring to cast her old coat. By this time the grass is nearly dry again, and so is the cow. I like oaten hay for cow feed, as it has more flag and is of a softer nature than wheaten. All the grass that can be cut should be made into hay, as we have not enough to make ensilage. A lot of good cow feed is wasted in the pea paddocks. I believe it pays to harvest the peas, thrash them, and stack the straw." Mr. Morriss then said he would feed half-oaten chaff and half-chaffed pea straw with a proportion of bran added. On this feed the cows would give as much milk as on all oaten chaff. The peas should be cut when a little on the green side; the peas as well as the straw would then be in the best condition. He did not think it would pay to rear calves on these small holdings. If calves were not kept there was more grass for the milch cows, and the skimmed milk if fed to pigs would bring in a good deal of money. He would select three crossbred sows of a good length, and mate them to a fairly short pure-bred boar to get litters about the beginning of February and August. The February litters he would sell as weaners, only keeping as many as the milk supply would keep going. Turnips and mangolds, in his opinion, were not much good to young pigs, but were useful for the sows. He would keep about 20 young ones from the August litters. If weaned in September, provided the weather was favorable, they could be brought up satisfactorily on skimmed milk and pollard and a small paddock of rape. For the general farm supplies of fodder he recommended the following methods:—Sow annually 10 acres with peas, and a similar area with oats for hay; 2 bush. to 2½ bush. of oats was the best quantity to sow. Poor soil required more seed than the richer and stronger land, as the plants did not stool so well on the poor land. He applied 1 cwt. bonedust to the acre. Peas were sown at the rate of 2½ bush. to 3 bush. per acre, with 2 cwt. bonedust. He preferred bonedust on account of the heavy rains which, in his opinion, dissolved superphosphates too rapidly and before the winter was over the plants were short of food. Bonedust also improved the soil beyond the first season. There should be several small paddocks of about an acre each, one always being left to grow for the sows. One should be under lucerne, one for green feed, one for rape, another for mangolds, turnips, &c., and two for potatoes. He then advised members to clear up all timber lying about and burn rubbish at the end of the summer. Every part of a small holding should bear fodder of some kind, and if the grass seeds from under the stack of grass hay were sown on the bare patches after burning trees, &c., a good crop of grass would spring up immediately. General discussion followed. Mr. Russell thought that a Holstein cow crossed with a Shorthorn bull would do well in this district. Mr. Smith was of opinion that the Jersey-Shorthorn cross was the most suitable dairy cow for this district. The Shorthorns could not stand the travelling over the hilly country as well as the smaller cattle.

Mount Pleasant, October 14.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Thompson (acting chair), Miller, Royal, and Maxwell (Hon. Sec.).

EXAMINATION OF STALLIONS.—Speaking on this subject, in reporting his attendance at Congress, Mr. Miller said that in his opinion the present system of examination

of stallions was to a great extent spoiling agricultural shows. He thought the grounds for rejecting stallions were in many cases only imaginary, and not serious enough to condemn the horses.

SEASON'S OUTLOOK.—It was reported that stock in this district were in splendid condition, but the crops were very poor on account of excessive moisture in the winter.

Port Elliot, October 15.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. Welch (chair), Pannel, Green, Barton, Hargreaves (Hon. Sec.), and one visitor.

DEEP PLOUGHING.—Discussion took place concerning the best depth to plough. It was agreed that some classes of soil were not suited to deep ploughing, and, in their opinion, the light soils of the district were among these. It had been found best in these parts to plough after the first rains and to keep the soil well worked up to seeding time, but care was necessary to avoid turning up the clay.

SORREL.—Members had found this weed best dealt with by working the land in summer thus exposing the roots to the sun.

Uraidla and Summertown, October 3.

(Average annual rainfall, 42½ in.)

PRESENT.—Messrs. Collins (chair), F. Y. and R. N. Cobbledick, P. C. and T. Day, Richardson, Rowe, Kessell, Gore, Hawke, Hart, G. F. and H. T. Johnson, Dyer, Hoffman, Prentice, Moulds, Smell (Hon. Sec.), and a number of visitors.

BEES AND FRUIT.—Mr. T. E. Whitelaw initiated a discussion on the relations that exist between bees and flowering plants. His remarks were illustrated by lantern slides, and depicted the important work performed by bees in carrying the pollen or fertilising dust from flower to flower and ensuring productive seed. It was demonstrated how necessary bees were to fruitgrowers, and why beekeepers should be encouraged to bring bees into fruit-producing districts. An interesting and spirited discussion ensued, the general opinion being that bees were undoubtedly of great assistance to orchardists. Inquiries were also made for recipes for using honey for cooking purposes in place of ordinary sugars, as it has the property of keeping cakes and biscuits from becoming dry.

Woodside, September 21.

(Average annual rainfall, 31 in.)

PRESENT.—Messrs. Fowler (chair), King, Attenborough, Keen, Rollbusch, Baldock, Johnston, Spoehr, Keddie, Knuckey, Hughes (Hon. Sec.), and one visitor.

CARE OF ANIMALS IN SICKNESS AND HEALTH.—Mr. King read a paper on "The Treatment of Stock." Cattle that were blown through eating clover, &c. (he said), could be speedily relieved by passing a piece of ½ in. hose into the stomach. The hose should be about 3 ft. 6 in. long, and well oiled. Some of the many causes of colic were change of food, damaged hay, and feeding horses before giving them water. This last applied more especially to animals brought in sweating from work. The owners were afraid to give them cold water till they had cooled down, and let them feed first. Then, after a drink, they were put to work with a full stomach, and colic resulted. Bad teeth also were sometimes responsible for colic and scouring. Green feed should be given regularly to horses. If none was procurable, a bran mash once a day, before the ordinary meal, made a good substitute. Sore shoulders could be prevented by having a separate collar for each horse and by exercising a little care. Before putting a collar on an unbroken horse, or one that had been turned out for a spell, the shoulders should be bathed with a solution of 1 oz. of sal ammoniac in 1 pt. of water, to harden the skin. The same lotion could be applied on removing the collar if the shoulder was at all affected. Referring to wounds, he said that, unless very large, perpendicular wounds seldom required stitching. Horizontal cuts, if at all large, should be sewn up, leaving openings for the discharge. A piece of sponge squeezed out of warm water would usually remove all impurities, and no washing was necessary after sewing up. The wound should be simply syringed with a solution of permanganate of potash and water, and dusted over with

boracic acid. Punctured wounds should be opened sufficiently to allow any discharge to get away freely. In cold weather it was a good thing to thoroughly grease the loins and rump of mares and cows a few days before foaling and calving. This produced warmth and kept out the wet. Cold water should always be available for animals to drink. Warm drinks and warm bran mashies should not be given. Owners of horses and cattle should keep ready for immediate use a piece of $\frac{3}{4}$ in. rubber hose, about 3ft. 6in. long, drenching bit, and a few ounces of laudanum, so that no time need be lost in relieving animals when in great pain. Sweet spirits of nitre should also be on hand. Stables should be warm, but well ventilated, and plenty of bedding given to the animals. Mr. King also referred to one or two other complaints, and recommended certain treatment.

SOUTH-EAST DISTRICT.

Kalangadoo, October 8.

PRESENT.—Messrs. Tucker (chair), McColl, Hunt, Guerin, Gibb, Kennedy, Earle, Bennett, Osborne, and Sudholz (Hon. Sec.).

POTATO-GROWING.—Discussion took place on the various phases of potato-growing. Mr. Bennett favored planting about 3 $\frac{1}{2}$ in. deep. Mr. Guerin preferred to put the sets in an open furrow and plough the loose mould on to them. In reply to a question the Chairman said that late in November, when the ground was getting dry, seed did not need to be planted any deeper than in October, when it was moist. All members considered late planting best for this district. They were of opinion that broadcast-ging manures gave the most satisfactory results. Mr. Guerin thought 18 in. between plants sufficient space. Most members considered they should have more room. The furrows should be cut 9 in. wide and the seed planted in every third furrow, leaving 20 in. or 24 in. between the sets. The width between the rows allowed a scarifier or moulder to be worked if necessary. Messrs. Guerin and Earle favored early digging. Messrs. Tucker and Bennett could not agree to this, as they considered that if not allowed to come to maturity the seed ran out and was inclined to become wild. Mr. Osborne considered all seed should be thoroughly matured before being harvested.

Keith, September 24.

PRESENT.—Messrs. Lock (chair), Schultz, Williams, Farrant, Leishman, Godlee, Crouch Tyner, J. Godlee, Lambert, and Dall (Hon. Sec.).

MIXED FARMING.—The following paper on this subject, written by Mr. Thompson, was read and discussed:—"To make the most of our holdings, especially the smaller ones, we should combine other industries with cereal-growing. There are at least four side lines that any farm should have, and these are—(1) Systematic horse-breeding; (2) a small dairy; (3) a few acres of orchard; and (4) a poultry run. If we have room we should also grow our own meat, keeping a small flock of sheep for this purpose, and our surplus heifers and steers. We have to keep a number of horses; therefore keep twice as many mares as geldings. Employ only the best stallion in the district. A number of farmers go for the cheapest sire, but that is a great mistake and results in a loss in the long run. Instead of having a two-year-old worth between £30 and £40, they get one worth about £20. If we want a good horse we must feed our foals well. Stunt him the first or second year, and he will never be as good as he otherwise would. There should be a small dairy with from six to 12 cows continually in milk. Instead of having to make butter in all sorts of weather, we shall then have enough cream to send a can to Adelaide every few days, and this will pay far better than selling dairy butter. In

conjunction with cows we want a good piggery so as to make the full use of the separated milk. We can grow peas, mangolds, beet, &c., for the pigs, and a couple of small lucerne paddocks to keep the breeding sows in between the litters. Keep four sows and breed so that rearing and fattening is continually going on. This at a low estimate should yield a net profit of £75 per annum, providing we grow and crush our own peas for fattening. We should cultivate lucerne and other suitable fodders for our stock all through the year. It is a great mistake to depend on the natural grasses, as they are not very luxuriant here. Of poultry we could comfortably keep a couple of hundred head. Get the best possible strains of White Leghorns for laying, and Buff Orpingtons (laying strain) and Silver Wyandottes for laying and table purposes combined. Build proper houses, and do not let the fowls roost in trees or on drays, stables, &c., as so many farmers do. Under such conditions they become a nuisance, and cannot give the best results. Cull out the old birds and stragglers, and there will be no need to complain. We require an incubator, and should hatch at least a hundred pullets each year, selling them soon after they are two years old. This will keep the numbers up, and there will always be young birds for egg production. We ought then to form an egg circle, as by that means we can get the best returns for our eggs. A small outlay and a few years' work would produce an orchard which would supply all fruit, raisins, currants, and preserves needed on the farm through the year. With the water close to the surface, as we have it, we could grow any kind of fruit. Three acres of vines and fruit trees would give us ample for all our own requirements. Put a brush fence on the north and west sides of the orchard to keep the strong winds off. Plant a double row of almonds round the border as an extra break; then cut the plot into sections. One acre could be devoted to vines, and the other two to currants and other fruit. Currants should be planted 12ft. apart, and grapes in rows of 12ft. with the vines 8ft. apart. Work the land up well. Make the holes with a crown in the bottom. Cut off the long and broken roots, and spread the others so that they will slope away nicely. Lift the vine slightly as you tread the earth around the roots. Prune vines back to about two buds. Fruit trees need to be planted in a similar manner, but 18ft. or 20ft. apart. Dig the holes 2ft. square and plant the tree at the same depth as when it was in the nursery. Loosen the bottom of the hole well with a crowbar, and if the ground is very poor add a little manure. If the trees require any more, add it in a liquid form when necessary. Prune the trees well back for two years. They will make up for it afterwards. If we keep the orchard well worked it should require no irrigation. To make these side lines of the farm a success, do not leave them to the wife or children to look after. Look after them yourself. Study them, and if necessary employ a man to do the other work of the farm. These things if properly looked after will pay all the wages of the farm, keep the house going, and will leave your wheat cheque all clear."

Kingston, September 24.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. Jackson (chair), Wilson, Loyd, Goode, Nosworthy, and Bennett (Hon. Sec.).

MANURING ORCHARDS.—The Chairman, in speaking of manures for orchards, said he had had the best results from bonedust. Superphosphates on his soil seemed to lessen rather than increase the yields of fruit and vegetables. Mr. Goode had found sheep manure very beneficial to lemon trees, causing a largely increased yield.

HORSE AND CATTLE COMPLAINTS.—Mr. Nosworthy was of opinion that dry barley grass, eaten by horses after the seed had fallen, was responsible for the formation of hard lumps in the stomach, and consequent poverty of blood. He recommended bleeding the animal and feeding on bran and chaff. Mr. Jackson said a packet of Epsom salts put in the chaff once a week greatly assisted in keeping horses healthy. Mr. Randall had lost a cow, and two others were affected with some complaint, the cause of which he attributed to native geranium (locally known as musk or tailors' needles). The dead cow was black in the kidneys, but otherwise the internal organs were apparently healthy. The geranium had been cut up for them, and they also had been fed with chaff. Members were of opinion that the trouble might have been caused by some poisonous weed in the feed, but considered the geranium could not be blamed for it.

FENCING.—This subject had been introduced at the previous meeting by Mr. Wright. In discussing the question, Mr. Goode said that iron posts could be procured 4ft. 1in. long at a much cheaper rate than if a little longer. Cut to that length there was no waste of iron. Mr. Wright, however, pointed out that in sandy country 4ft. 1in. would not be long enough. Mr. Nosworthy thought iron posts should be cut straight across, so that

they would not run out of the perpendicular if a stone was met with when being driven in. It was stated, in reply to a question, that if barbed wire was strained up very tight the rust-proof coating put on in the galvanizing process cracked and flew off, and the exposed iron rusted.

EXPERIMENTAL WORK.—The Chairman thought each farmer should have his own experimental plot, as the Government experiment farms could not possibly solve all questions for the different types of soil met with in this State. Mr. Nosworthy pointed out that when commencing farming every man could not afford to conduct experiments; such action might spell ruin. Hence the advice of the Government experts was of very great value.

Millicent, October 11.

(Average annual rainfall, 28½ in.)

PRESENT.—Messrs. Holzgrebe (chair), Harris, Major, Stewart, Day, Mutton, and Thompson (Hon. Sec.).

INCUBATORS IN THE SOUTH-EAST.—General conversation took place concerning artificial incubation of poultry. Members were of opinion that it was more satisfactory to use hens in this cold climate. The incubators might successfully hatch the chicks, but the latter did not thrive so well as if they had a natural mother.

MONEY IN SKINS.—Mr. Stewart said he had received in Adelaide for 10 fox winter skins £3 8s. 4d., five others sold at £1 3s. 4d., and two weevily skins at 1s. 9d. and 1s. each. His net return was £1 8s. 2d. Had they been sold locally the return would have been £2 10s. Mr. Holzgrebe had visited a skindealer's premises whilst in Adelaide, and learnt a lot about the preparation of farmers' lots of skins and hides for the market. It was astonishing how much the farmer lost by sending in badly skinned, dirty, and ill-stretched skins. The best way to dry sheepskins was to hang them over a round, broad rail, and put a nail in, or tie them down, at the head and the tail, so that the skin would not shrink.

Mount Gambier, September 10.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Sassanowsky (chair), Ellis, Watson, Mitchell, Ruwoldt, Keegan, Pritchard, Wheeler, Niquet, Schlegel, Buck, and Collins (Hon. Sec.).

PROFITABLE DAIRYING.—Mr. Buck read a paper on dairying. He understood that it had been estimated that, roughly, half the dairy cows in this State were not paying for their keep. The average farmer did not know which were the profitable and unprofitable cows in his herd. He started with common cows on very poor land, which did not produce enough grass to keep the cows in fair condition without giving milk. He thought at first that the cows were no good, but soon found where the mistake was, and started to grow feed for them. His practice was to plough in March for oats, barley, and mustard for green feed. It was good to mix the oats and barley, as cows liked a frequent change of food. If they grazed too long on oats it would taint the milk and butter. After the cows were milked in the evening they were put in a sheltered paddock, where there was plenty of straw to bind the soft food and keep them from scouring. Mustard grew very fast—it was a good warm food for cold weather and a shelter for young calves. It was wise to have a paddock spelling to let the grass get a good start against the time when the stock would have to be taken off the oats and barley, to give them a chance to grow again. If the mustard had to be fed off the stock should be put on it fairly early before it was too strong. Cows required some grass hay also, and in summer time a few potatoes would help to keep them from getting dry bible. Maize, sorghum, and mangels should be grown for the summer. The long red mangold and the yellow globe turnip made good fodder, but the latter fared badly in a dry season on account of its shallow rooting. Turnips were useful in winter, but in summer they tainted the milk. He would give first place to the Shorthorn cows and the Jersey crossbred next. Cows should be handled gently and kindly. Mr. Buck then described his method of getting cows into the bails, and emphasised the need for a good substantial yard. If a wild cow once got away she would try the same dodge again and again. In reply to questions he said it was best to mix the barley and Algerian oats before drilling it in. He made the butter on his own premises and found a ready sale for it.

Mount Gambier, October 8.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Sassanowsky (chair), Sutton, Buck, Ruwoldt, Dow, Ellis, Schlegel, Kileby, Wheeler, Niquet, Pritchard, Major, Holloway, Holding, Smith, Wedd, G. and D. Collins (Hon. Sec.).

CONGRESS REPORT.—Delegates to Congress gave full reports of the proceedings and spoke of their trip through the Lower North. After a general discussion it was resolved to ask the Advisory Board if it would be possible for more of the Government Experts to give addresses at the Annual Congress, as, in the opinion of this Branch, these were of great value.

Naracoorte, October 8.

(Average annual rainfall, 22 in.)

PRESENT.—Messrs. Coe (chair), Tolmer, Bray, Wright, Rogers, Caldwell, and Schinkel (Hon. Sec.).

EXAMINATION OF STALLIONS.—Following on a report of Congress given by the delegates from this Branch, Mr. Wright said that at the recent parade held in Naracoorte for the inspection of stallions for certificates of soundness the inspector did not inform owners what their horses were rejected for. There should be some less expensive method of an appeal against a decision. If the owner of a rejected stallion knew the reason for the rejection he would be in a better position to know whether to appeal. Mr. Schinkel said that the present examination was only the beginning of the prevention of all stallions which were not sound from being used for breeding purposes, and it was highly necessary that the examination should be a safe one, and every facility given for testing it. It was resolved to inquire whether owners of rejected stallions could be furnished with the reasons for their rejection. [A reference to page 205, October, 1909, issue of the *Journal* will show that the reason for refusal of certificate will only be disclosed to the owner of the stallion, or his agent, authorised in writing. The wisdom of this rule must be apparent to all.—ED.]

LAMBS AND THE BLOWFLY PEST.—Mr. Rogers read the following advice, extracted from a letter received by him from a sheepowner of considerable experience in New South Wales:—"Leave the lamb's tail sufficiently long to overlap the upper part of the breech wool 1½ in., so that the tail will part or make a channel for the water to fall clear off the breech wool. If the tail is docked above the breech wool the top part of the breech wool will grow straight out and intercept the drip, which will soak down the thighs and cause the trouble. My two and four-tooth sheep have not been troubled with the blowfly. My older sheep, with short tails, we have to breech and dress the same as others. My son has 3,000 young sheep, mostly ewes, and not one has been blown—through being docked in the tail as described. Some seem to think that the tail would interfere with the service of the ram and curtail the percentage of lambs. My experience this last year with 30 per cent. of maiden ewes is that we marked 84 per cent. of lambs; so on that score there is nothing to fear. Those that have made an inspection are quite satisfied that this is the natural remedy for the blowfly." Discussion followed. Members generally considered that the remedy was to leave the tails longer when lamb-marking. Mr. Wright had found the maggots on ewes near the udder. He had no doubt that leaving the tail a little long would enable the sheep to shake it, and thus keep the flies away. Mr. Tolmer said that purchasers of freezing lambs did not like them to have long tails.

QUALITIES OF MANURES.—Following on the question as to the quality of manures, Mr. Schinkel said the Inspector of Fertilisers tested a percentage of bags in each shipment of manures coming into the State, and also took frequent samples at local works. He was always glad to hear from farmers who were in doubt as to the quality of fertilisers purchased by them. There were heavy fines under the Fertilisers Act for selling manures under the guaranteed contents.

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Visits to Roseworthy College.

Although it is now widely recognised that the Farmers' Day at the college fulfils a very useful function and enables farmers from all parts of the State to inspect the crops and note the progress being made at the college, and at the same time provides an opportunity for the interchange of views and experiences, yet it cannot be gainsaid that the visitors lose many of the educational advantages to be gained from the trip owing to the fact that the party is too large to admit of personal explanations with reference to the farm operations of the year. Many of the Bureau members are fully cognisant of this, and those who are fortunate enough to be located in districts within easy range of the college have wisely persuaded their fellow members to arrange for special visits of inspection, either by themselves or in conjunction with neighboring Bureaux. No less than six such bodies concluded arrangements of this nature during the past few weeks. The Angaston and Lyndoch Branches combined to form one party, and the Watervale, Whyte-Yarcowie, Forest Range, and Saddleworth Branches were allotted days to themselves. The Advisory Board of Agriculture paid its annual visit to the institution on October 27th, and towards the close of the same month the Faculty of Science of the University of Adelaide, to which the Roseworthy College is affiliated, spent a day looking through the laboratories and classrooms and inspecting the experimental work in progress.

North Booborowie Purchased for Closer Settlement.

The Government have purchased from Messrs. H. Dutton and J. Melrose the well-known North Booborowie Station, just south of Canowie. This property consists of 33,587 acres, and the price paid by the Government is £6 2s. 6d. per acre. Most of this block is magnificent agricultural land, several thousand acres are suitable for lucerne, while the balance is high-quality grazing country. It is expected that this country will be available for settlement in a few months' time. In addition, about 6,000 acres of South Booborowie, about 12 miles from the Burra, is to be offered for sale by auction in March. With the cutting up of such large areas of Canowie, Hill River, and Booborowie, which comprise some of the best land in the North, this portion of the State should show great progress during the next few years.

Rye as a Cereal Crop.

In South Australia rye is grown almost entirely for green feed, and the demand for grain is practically limited to requirements for the green crop seedling. As rye will produce fair crops on poor sandy soil unsuitable for wheat production it could be profitably cultivated in many parts of the State where there is a market for the grain. In the United States of America about 2,000,000 acres, yielding from 27,000,000bush. to 33,000,000bush., are cropped with rye. In Minnesota the value per acre of the rye crop exceeds that of wheat without giving any consideration to the extra value of rye straw. The grain is used quite extensively for flour production, rye bread being considered nutritious and specially suitable for persons engaged in hard manual labor. The grain is also used for stock feeding, especially in Germany, though when fed to dairy cattle it imparts a somewhat bitter flavor to the milk.

Formalin for Pickling Seed.

In a bulletin recently issued by the Utah Experiment Station the results of numerous experiments with formalin as a preventive of injury by the various smuts affecting cereals are given. The conclusions arrived at are as follows:—"Formalin treatment is effective in preventing the loose and covered smut of oats, covered smut of barley, and bunt of wheat. The formalin solution, even at the rate of 1lb. to 60galls. of water, reduces somewhat the vitality of the seeds. Oats are more resistant to the influence of formalin than either wheat or barley. The best strength of solution to use is 1lb. of formalin to 50galls. of water. If the treated seed be thoroughly dried it may be safely kept for at least six weeks after treatment, except with oats. It is mentioned that at the Indiana Experiment Station it was found that when the seed was soaked for several hours in cold water before treatment with formalin the germinating powers of the wheat was not affected, but the smut was completely destroyed. Formalin does not appear to be a preventive against loose smut of wheat and barley." At Parafield pickling with formalin has not been found a preventive of loose smut of oats.

Increase the Yields Per Acre.

The following extract from an American report is of great interest, and shows how it is possible to greatly increase the yield per acre by the selection of seed and proper preparation of the soil. Some of our agricultural societies might emulate this example, and offer to the boy growing the most wheat on an acre or half acre a free trip to the Adelaide show:—"More than 12,000 southern boys less than 18 years old planted and cultivated an acre of corn

each last year, under the direction of the Department of Agriculture. Persons interested in the experiment in Arkansas, Mississippi, South Carolina, and Virginia offered to pay the expenses of a trip to Washington for the boy in each State who raised the greatest amount of corn on his acre. The winning boys will soon visit the national capital. The average yield of corn to the acre in 1909 was a little more than 25bush. The South Carolina boy, who made the best record, produced 152½bush; the winning Mississippi boy raised 147bush.; the Arkansas boy, 135bush., and the boy in Virginia, 122bush. The average raised by each of the 12,000 was 60bush. The instructions given to those boys by the Department of Agriculture are available to every farmer in the country. If they should be followed exactly, the yield of corn to the acre could easily be doubled in a single year. Intensive cultivation is worth while on all crops. The average yield of potatoes to the acre in 1909 was 107bush., but the Maine farmers averaged 225bush., and some of the most progressive of them dug 400bush. to the acre. The yield of corn and potatoes depend more upon cultivation and fertilisation than upon the soil, and there is practically no part in the United States in which these crops cannot be raised successfully. It is beyond doubt that larger crops can be produced from 10 acres thoroughly tilled than from two or even three times 10 acres cultivated as they usually are. The fact that the South Carolina prizewinner raised more corn on one acre than the average farmer produces from six tells a story that should not be lost upon those for whose benefit the experiment was made."

Walnuts Attacked by Codlin Moth.

A well-developed walnut would appear to most people to be a very unlikely object of attack by codlin moth caterpillars, but in California some walnut growers report considerable number of nuts infected. This matter has been investigated by an officer of the United States of America Bureau of Entomology, who reports that the trouble occurs in a number of orchards, but apparently only the late broods of moth attack the walnut. No sign of infestation of young nuts has been noted, the attack occurring after the shell hardens. Sometimes the caterpillars burrow first into the fleshy hull, but the majority tunnel through the fibrous tissue connecting the halves of the shell at the stem end. The kernel, or part of it, is taken by the caterpillar, and what is left becomes rancid. Many trees adjacent to packing sheds and drying grounds have from 5 per cent. to 25 per cent. of the nuts infested, the soft-shell varieties with fibrous tissue connecting the shells at the stem end being chiefly attacked. It is believed that the walnut is attacked by the late brood in the absence of the fruits which form the regular food of this insect.

Draught Stock Industry in New Zealand.

Most breeders of draught stock in Australia realise that New Zealand is in the front rank of the draught horse breeding industry. A study of any large sale catalogue will indicate the value placed by the salesman on the fact of any horse having been imported from New Zealand. In 1908 New Zealand shipped 404 horses oversea, principally to Australia; last year the total reached 1,607. This includes all classes of horses, but pedigree draughts predominate. New South Wales and Victoria are the largest buyers, each taking between 640 and 680 animals; South Australia's share was 13. The value of horses exported last year from New Zealand were valued at £55,700, while the figures for the current year are much larger. Victoria took 657 horses valued at £14,255, while New South Wales bought 1,440 horses at a cost of £36,000. In the latter figures, however, doubtless include a number of animals intended for transhipment to the other States.

Lemons in the Summer.

A recent writer on the agricultural industries of Sicily refers to the question of the summer ripening of lemons in the following terms:—"Since the United States has grown to depend so largely upon Californian lemons, Sicilian growers have made an effort to have the crop mature in summer, when the demand for fruit is greatest and the prices highest. To bring about this result the orchards are not irrigated during the summer, the top roots uncovered, and the trees allowed to dry up. In the early autumn the roots are fertilised and recovered, and the trees are plentifully watered. By October they show great vigor; they blossom in November, and the fruit ripens in July. The treatment, strange to say, does not seem to impair the vitality of the trees." South Australian lemon-growers would find their trees much more profitable if they could induce them to ripen their fruits in October and November instead of mid-winter. The above treatment appears too drastic for local conditions, but it is possible some modification might be made to bring about the desired results. It is certainly worth a trial on a small scale.

Limewater Bordeaux Mixture.

In a report on Bordeaux mixture issued by Spencer U. Pickering, of Woburn Experimental Fruit Farm, a few years since, after describing the presumed action of the fungicide, he recommended the use of limewater instead of milk of lime and the reduction in the quantity of bluestone. The latest formula given provided for 10ozs. only of bluestone in 50galls. of limewater. In a recent report Mr. McAlpine, of the Victorian Department of Agriculture, states

that his experiments have shown this to be equally as effective as the ordinary Bordeaux mixture in the prevention of scab in apples. It adhered just as well, cost very much less, and had the further advantage of freedom from gritty particles. Mr. McAlpine states that 1lb. of lime is ample for 50galls. of limewater.

Bees and Fruit.

In connection with the article in November issue on this subject, the following reference in a recent number of the *Gardeners' Chronicle* is of interest:—"At Tonbridge a large Bigarreau cherry tree bore good crops of fruit whilst a hive of bees was situated near it; but the bees had foul brood and were destroyed, with the consequence that for three years the trees bore hardly any cherries. Since again placing a fresh hive of bees near the tree the cherries have been plentiful. The writer of the article, Mr. Shrivell, strongly recommends the keeping of bees near orchards, and considers the work they do in setting fruit would be recompense for the trouble, even without considering the honey." In South Australia the setting of fruit this year is very disappointing in many districts. Whether this is due directly to the frequent cold changes during the blossoming, or to the fact that the bees and other insects were not active during these spells, no one can say definitely, but the necessity for bees in the orchard cannot be questioned.

Imports and Exports of Fruits.

During the month of November 6,619bush. of fresh fruits, 573pkgs. of vegetables, 6,518 bags of potatoes, 705 bags of onions, and 68pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act; 180bush. of bananas (chiefly over-ripe) were destroyed. The exports to inter-State markets examined and passed at the same places comprised 14,399bush. of fresh fruits, 4,058pkgs. of vegetables, and 18pkgs. of plants. In addition, 193pkgs. of fresh fruits were certified for export at Gawler. Under the Federal Commerce Act 1,956 cases of fresh fruits, 2,823pkgs. of dried fruits, 97pkgs. of preserved fruit, and 209pkgs. of honey were exported to oversea markets during the same period. These were distributed as follows:—For London, 2,130pkgs. dried fruit, 159pkgs. honey; for Germany, 50pkgs. honey and 9pkgs. preserved fruit; for New Zealand, 1,956 cases citrus fruits, 690pkgs. dried fruit, and 25pkgs. preserved fruit; for India and East, 63pkgs. preserved fruit and 3pkgs. dried fruit. Under the Federal Quarantine Act 3,414pkgs. of plants, seeds, bulbs, &c., were admitted from oversea sources.

Canadian Expenditure on Agriculture.

The appropriations for the Canadian Department of Agriculture for the ensuing year, as recently authorised, aggregate £207,400—an increase of £33,000 over the present year. According to the *Experimental Station Record* of the United States Department of Agriculture, some of the principal items are £37,000 for the maintenance of experimental farms (including an increase of £9,000 for the establishment of additional farms), £2,000 for the publications of the experimental farms, £33,600 for exhibitions, £1,000 for the five stations for the fumigation of nursery stock, £20,000 for the development of the dairy and fruit industries, £16,400 for the establishment of cold storage warehouses and experiments in cold storage for fruit, £10,400 for the development of the meat industry, £50,000 for animal diseases, £10,000 for seed inspection work, £4,000 for the enforcement of the Meat and Canned Food Acts, £1,000 for tobacco investigations, and £2,000 for the International Institute of Agriculture.

The Situation of the Farm.

The situation of the farm—the altitude of it, the climate to which it is subject, the aspect, whether toward or away from the sun, and the shelter, whether natural or artificial, with which it is supplied—is of greater moment than many men seem to be aware of. A farm unfavorably situated in these respects is more or less cold, and therefore detrimental for stock, and will not produce herbage so varied and plentiful and nutritious as will be found elsewhere.—PROF. J. P. SHELDON.

Boiling Meat to Retain its Flavor.

A French authority writing on the science of cookery advises that in boiling meat the piece be first plunged into boiling water, and that after boiling for a few minutes enough cold water be added to lower the temperature to about 160° Fahrenheit, at which point the meat should be allowed to cook for several hours. This odd method, which the author acknowledges is diametrically opposed to common practice, will result, he says, in making the boiled meat as juicy as a good roast. The reason for adopting it is that the albumen of the meat will coagulate at once on contact with the boiling water, and will protect the fibrin from solution without opposing the passage of heat. The meat will thus cook slowly, after the addition of the cold water, without becoming tasteless, retaining all its natural juices as when roasted.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

RYE.

"Novice" writes—(1) Is there a market for any quantity of this cereal? (2) What is the usual price for the grain? (3) What class of soil is most suitable for its production? (4) What is the usual yield on average soils? (5) Is it suitable for hay, chaff, or green feed? (6) When will particulars of the experiments in the South-East be available?"

Reply—" (1) It is very questionable if any large parcels of rye could be disposed of in Adelaide at profitable prices, as there the demand is limited. (2) It is difficult to say what is a fair average price. Rye can be purchased in Adelaide by the bag at about 4s. to 4s. 3d. per bushel ret. il. It would be risky to reckon on more than 3s. per bushel at present rates for wheat. (3) Rye will grow in very light soils; in fact, in the South-East it does very well on the bracken sands. It will also grow well on other types of soil, but usually it is more profitable to sow oats, barley, or wheat on the stronger types of land. (4) A good crop of rye will go from 30bush. to 40bush. (5) It is best suited for early green feed, owing to the rapid growth which it makes under comparatively cool conditions. It needs to be cut early, as it becomes too hard and wiry in the later stage. If cut when about 3ft. high it will, if the season be favorable, furnish a useful second growth which may be left for seed. The straw is valuable for bedding or thatching, and also for collar-making. For hay and chaff, however, it is too tough to be of much value. (6) Experimental work carried out in the South-East will be published in the annual report of the Hon. Minister of Agriculture." [Replies to all but questions 1 and 2 are supplied by Mr. W. J. Colebatch (B.Sc., M.R.C.V.S.).—Ed.].

EFFECT OF CUT MALLEE SHOOTS ON GROWING CROPS.

"A. G. K.," Peake, writes—"Do cut mallee shoots, lying on the ground, affect the growing crop, as shoot-cutting is so often left until after seeding?"

I have heard that if growing tomatoes are covered with mallee boughs the water dropping off them on to the plants is apt to injure them."

Mr. Summers replies—"This would depend largely upon the quantity of shoots; but it is very doubtful if any injury would result."

DESTRUCTION OF WEEDS IN CROPS.

"A. G. K.," Peake, writes—"Does a strong solution of copper sulphate materially injure the soil for growing vegetation, as I find it is very effective in destroying my sorrel."

Mr. W. J. Colebatch (B.Sc., M.R.C.V.S.) replies—"Copper sulphate is largely used for destroying weeds growing in crops. The strength of the solution varies from 2 per cent. to 4 per cent. Stronger solutions are apt to permanently damage the crops in which the weeds are growing. So far as the soil is concerned it is improbable that injury would result from the application of solutions of such strength as would be required for the destruction of vegetation."

THE BOTFLY.

"Northfield" writes—"Will the botfly kill a horse? What are the symptoms shown by the animal affected by the fly?"

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Cases are on record where deaths in horses have been caused by larvæ of the botfly. No definite symptoms can be described."

MORTALITY IN SHEEP.

"B. W.," Hartley, writes—"Could you enlighten me as to the probable cause of the death of a number of sheep, mostly big lambs fit for market. They were running in a stubble paddock, consisting of self-sown oats, usual grasses, and thistles, &c. Those that died seemed to have scoured rather badly."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Rich feed at certain periods will cause deaths amongst well-conditioned ewes and lambs."

WHOLE v. CRUSHED OATS FOR FEED.

"T. E. H.," Butler, writes—"What is the difference in feeding values between whole and crushed oats? I have read that the latter lose considerably in their feeding value after two or three days owing to attack by grubs or weevils."

Mr. W. J. Colebatch, M.R.C.V.S., B.Sc. (Agric.), replies—"So far as food values are revealed by analysis no difference is to be seen between raw and crushed oats. Some of the fine particles are lost in the process of crushing, but the percentage composition is not materially affected thereby. The effect of bruising or crushing is to break through the protective outer

coat, and thus facilitate the action of the digestive juices, and at the same time improve the palatability of the food stuff. The smoothness of the outer coat leads to too rapid swallowing, with the result that an appreciable proportion of the partially masticated grain passes straight through the food canal without being digested. Müntz has shown that by crushing oats this proportion can be very greatly reduced, and, further, that when whole oats are mixed with other forage, such as chaff or bran, the same result is obtained. He has also shown that in the case of grains with thin coverings crushing has little or no effect in improving the digestibility. It is unwise to keep crushed grains on hand for a long period, as they tend to undergo fermentation and become mouldy; but I am not aware that they are frequently attacked by injurious insects."

LIME AND GYPSUM FOR STIFF SOILS.

"J. M.," Myponga, writes—" (1) About how much gypsum per acre does it need to make tough land friable? (2) Which of the following crops would be fertilised by the application of gypsum to the soil—cereals, legumes, potatoes, onions, and root crops?"

The Acting Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S.) replies—" (1) It is true that gypsum, like many other calcium compounds, will act beneficially on the physical texture of stiff clay soils by flocculating or granulating the finer particles, but lime is a much more satisfactory material for this purpose. It should be used at the rate of from 7cwts. to 11cwts. per acre if quick results are desired, and inasmuch as lime invariably tends to sink into the lower layers, further dressings of not less than 5cwts. per acre should be given every second or third season until the nature of the soil has been changed. (2) All crops that respond to potassic manures derive benefit from the use of gypsum, as the latter has the power of liberating potash from the soil compounds. Legumes in particular are grateful for potash. Potatoes and onions also show their appreciation, but in South Australia root crops and cereals do not as a rule benefit either by the direct application of potash or from that amount of the soil potash that is set free by the use of gypsum."

NON-FRUITING OF APRICOT TREES.

"A. T.," Inglewood, writes—"I have a young orchard (planted five years ago), and among other trees I have several apricots. These apricots do not bear fruit, although this year they bloomed profusely. They are healthy trees, and are planted in what is considered a very suitable position. I shall be pleased to have some information on the matter."

The Horticultural Instructor (Mr. George Quinn) replies—"Without personal inspection and closer conditions of soil and climate I cannot venture a reply beyond stating that usually in localities where these trees bloom

freely they fruit, unless unusual climatic changes—consisting chiefly of great fall in temperature or prolonged drizzly rain—occur at that stage.”

KALE AS FEED FOR WORKING HORSES.

“Forster” wishes to know if it is advisable to feed a horse with kale or thousand-headed cabbage.

The Acting Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S.) replies—“This class of green feed is not suited for working horses. Apart from the fact that the feeding of cabbages usually involves far too much labor to make it an economic practice, the leaves are too watery and gaseous to furnish necessary amount of nutriment without causing derangements of the digestive system. Not only do they tend to purge and give rise to colicky symptoms, but they also lead to a considerable amount of flatulency, which is both unhealthy and unpleasant. Brood mares, colts, and invalids may at times be tempted by the exhibition of freshly-gathered leaves, but on no account should dead or decaying portions be fed to horses or, for that matter, to any other class of farm animal.”

FEEDING OFF SMUTTY BARLEY, ETC.

“Forster” wishes to know if smutty barley, &c., was injurious when fed to horses.

The Acting Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S.) replies—“Smut in grains. Plants are attacked by numerous fungi or moulds which are in many instances injurious to the animals which partake of them. It is well known that mouldy or musty grains bring about a condition of extreme weakness and emaciation, and frequently death. In some seasons the animals are affected by a form of paralysis, drowsiness, and delirium, suggesting brain trouble. Again, the main symptoms may be indigestion, with flatulency and paralysis of the stomach and bowels. As a rule, however, when taken in small doses, the excessive loss of urine and phosphates are the chief troubles. The true bunt (*Tilletia*) is more to be feared than the loose smuts (*Ustilago*), although when the latter are eaten in any quantity they are apt to cause fever, paralysis, and, in the case of brood mares, abortion. Inflammation of the bowels may also follow if the grains are badly affected. It has not been clearly shown yet whether these various symptoms are attributable directly to the fungi, or to the chemical changes which they have induced in the grain.”

THRIPS IN ONIONS.

“Uraidla” asks for information in regard to the use of sprays for this pest.

The Horticultural Instructor (Mr. G. Quinn) replies—“In the United States of America considerable attention has been given to these pests, more particularly to one species attacking the pear trees. In Bulletin 80, Part IV.,

published in 1909, success is reported from the use of sprays made of an extract of strong tobacco and an emulsion made from whale oil soap and distillat oil (28° Baume). Where these have been used in combination the best results have been achieved. Great stress is laid upon applying the wash with great pressure and in the form of a coarse spray. I would suggest trying a strong tobacco and soap spray, using the extract obtained from steeping tobacco dust (obtainable at seed warehouses or tobacco factories) at the rate of $\frac{1}{2}$ lb. to each gallon of hot water, using about 2ozs. of soap to each gallon of tobacco liquor. Kerosine and soap emulsion is made by boiling 1lb. soap in 1gall. of water and churning into it 2galls. kerosine violently for 15min. to 20min., until a creamy emulsion forms. This could be diluted at the rate of 1 part in 12 parts of water for spraying, or the tobacco liquor without the soap could be used instead of water alone. Probably two sprayings would be needed during the growth of the onions. The American and European studies prove these pests to breed or hibernate in all sorts of vegetation; consequently clean tillage should prove a useful means of prevention."

USE OF FERTILISERS IN THE GARDEN.

"E. A. J." writes—"Can you inform me—(1) What are the best artificial manures for the flower garden? (2) How much of each variety should be used to the square yard? (3) What variety is best for shrubs and growing trees? (4) Are coal ashes of any value as a manure for the garden? (5) What are the chemical constituents of mallee ashes? Are they of any use?"

Replies—(1) Mr. Quinn states that he knows of no definite tests with artificial fertilisers in flower gardens. The question is a complicated one, as the soil varies much in different localities, and the variety of plants grown together in one bed usually shows even greater diversity. Assuming, however, the soil is of good texture, well supplied with organic matter from the use of stable manure, and that lime is not deficient, he suggests the following *quantities per square yard*. (2) Three ounces superphosphate, 1oz. sulphate of potash, 1oz. sulphate of ammonia. These weights represent 907 $\frac{1}{2}$ lbs., 302 $\frac{1}{2}$ lbs., 302 $\frac{1}{2}$ lbs. per acre respectively. They may be mixed together and put on in one spreading, hoed into the soil, and then the ground should receive a good watering. The dose of sulphate of ammonia may be repeated in about six weeks afterwards. (3) For shrubs and growing trees use the same formula, with the exception that 4ozs. of good medium fine bonedust be substituted for the superphosphate. (4) Coal ashes contain only a very minute percentage of potash and phosphoric acid, about 3 per cent. to 4 per cent. of lime, and 70 per cent. to 75 per cent. of silica. Except for the loosening effect of large quantities on a stiff soil, they are probably of no value in the garden. (5) Unleached mallee ashes contain 2 per cent. to 2 $\frac{1}{2}$ per cent. potash, a little phosphoric acid, and about 40 per cent. to 45 per cent. of lime, and would be of value in stiff soil, and especially where leguminous plants are growing.

MILLING EXPERIMENTS.

I.—MILLING QUALITIES OF HIGH AND LOW GRADE WHEATS.

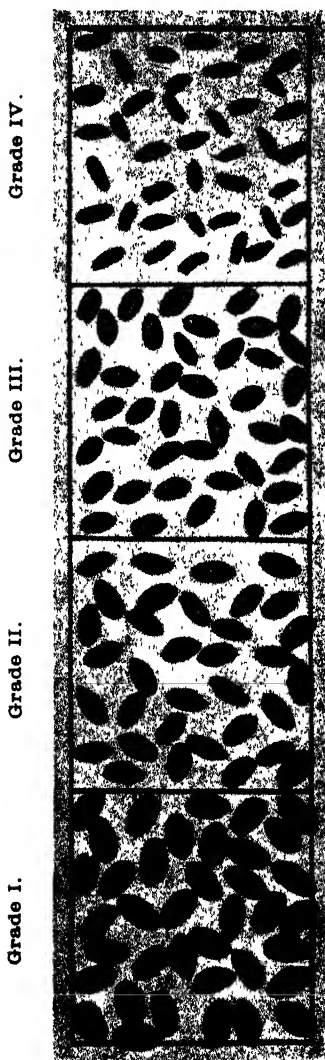
By A. E. V. RICHARDSON, B.A., B.Sc.

A number of interesting milling investigations have been carried out with the aid of the small experimental mill of the department; and as some of the results obtained are interesting and suggestive, it is well to place them on record in a series of milling articles.

Every wheatgrower is fully alive to the importance of growing varieties of wheat which give heavy yields per acre. He rarely takes more than a passing interest, however, in the quality of the wheat, and under present conditions what incentive has he to do so? The price he gets per bushel is the same for wheats of high quality like Bobs and Comeback, or even f.a.q. wheat and wheat of high bushel weight. What incentive has he to produce a fine even sample of high quality when he can secure only f.a.q. prices for his product? It is universally admitted that varieties of wheat like Comeback are far superior in milling quality to the varieties in general use to-day, and, in fact, these varieties used to be appreciated by the miller to the tune of 6d. per bushel in advance of ordinary f.a.q. rates. If the miller and wheatbuyer were to discriminate between varieties of wheat and pay such enhanced prices as obtained a few years ago, it is reasonably certain that a great stimulus would be given to the production of high quality wheat.

The same remarks apply to f.a.q. wheat. At present there is no inducement whatever to produce wheat of quality higher than the f.a.q. standard.

The object of the investigations detailed below was to find out whether there was any material difference in milling quality in samples of high or low grade wheat of the



same variety; in other words, to find out whether a sample considerably above the f.a.q. standard was of better milling quality than a sample of the same variety considerably below the standard.

The variety selected was Federation, grown at the Parafield Experimental Farm, and it was graded into four classes by means of hand sieves. Six sieves were used for this purpose, the longitudinal mesh of which was .325, .300, .275, .25, .225, and .2 c.m., respectively. Practically all the grains passed through sieves 1 and 2. Grade I. constituted all those grains retained by a .275 c.m. sieve. Grade II. consisted of grains which would pass through a .275 c.m. sieve, but which were retained by a .25 c.m. sieve. Similarly Grade III. comprised those grains within the limits of .2 and .225 c.m., and Grade IV. was made up of those grains which passed through a .2 c.m. sieve.

As a large proportion of Grade IV. consisted of cracked grain, the produce was carefully hand-picked, and to make the comparisons fair, all cracked grain was carefully excluded. Plate I. gives some indication of the relative sizes of the four grades.

In order to test the efficacy of the grading, determinations were made to find out the bushel weight, volume, and typical grain of each grade.

Table I. gives the bushel weight, average weight, and average volume of each grain.

TABLE I.

Grade.	Bushel Weight.	Weight of 100 Grains.	Average Weight.	Volume of 100 Grains.	Average Volume.
I.....	68.25	4.899	grs. .489	3.6926	q. cms. .0369
II.	87.75	4.048	.405	2.9948	.0299
III.	63.1	2.687	.268	1.8814	.0188
IV.	55.2	1.481	.148	1.2414	.0124

The volume of the grain was determined by the specific gravity bottle method—familiar in physical laboratories—and there is no need to enter into the technical details here.

The various grades were then milled in duplicate with the exception of Grade IV., as only 15ozs. of this grade could be obtained from the whole of the seed available.

As details of the working of the mill have already been described in a previous article (*vide* December, 1909, and January, 1910), there is no need to discuss this aspect of the question.

The wheat of each grade was conditioned in the usual way and then milled.

Table II. gives the details of the milling.

TABLE II.—MILLING PRODUCTS.

Grade.	Amount of Grain Taken. (Wt. in Grs.)	Weight of "Rendered" Grain. (Wt. in Grs.)	Weight.			Percentage.		
			Flour.	Bran.	Pollard.	Flour.	Bran.	Pollard.
I.A.	8,312½	8,512	6,479	950	940	77·4	11·5	11·1
I.B.	10,400	10,581	8,075	1,220	1,125	77·4	11·7	10·9
II.A.	8,437½	8,659	6,395	1,030	1,046	75·5	12·2	12·3
II.B.	8,750	8,992	6,517	1,149	1,101	74·4	12·5	13·1
III.A.	7,000	7,316	4,970	1,122	1,180	68·4	15·4	16·2
III.B.	7,000	7,389	5,065	1,110	1,150	69·1	15·3	15·6
IV.A.	4,440	4,580	2,640	630	1,265	58·2	14·0	27·8

A careful examination of Table II. will show that the higher grade wheats yield considerably more flour than the lower grade wheats. The yield of Grades I. and II. is considerably above our average we usually obtain in our milling work, but it must be remembered that we very rarely in practice get samples so uniform and so plump as those of Grades I. and II.

With increase of bushel weight and average volume there is an increase in flour yield and a fall in the ratio of bran to straight grade flour. Grade IV.A, which consisted of very shrivelled grains, the bushel weight of which was 55·2lbs., average grain weighing ·0148grs., and the average volume ·0124 c. cms., gave a flour yield considerably below that usually obtained in flour mills. Such a sample could not, of course, be profitably milled, as the percentage ratio of offal to flour yield is far too high.

If we assume, for purposes of argument, that the quality of the flour made from each grade is equal, the following table will show the value of 1 ton of 2,000lbs. of each grade of wheat when milled. Flour is reckoned at £10 per ton, pollard and bran at 1s. 2d. per bushel.

TABLE III.—Commercial Value of Milling Products.

<i>Grade I.—</i>	£ s. d.
1,548lbs. of straight grade flour, @ £10 per ton	7 14 10
452lbs. bran and pollard, @ 1s. 2d. per bushel.....	1 6 4
Total	£9 1 2
<i>Grade II.—</i>	£ s. d.
1,500lbs. flour	7 10 0
500lbs. bran and pollard	1 9 2
	£8 19 2
<i>Grade III.—</i>	£ s. d.
1,375lbs. flour	6 17 6
625lbs. bran and pollard	1 16 5
	£8 13 11
<i>Grade IV.—</i>	£ s. d.
1,164lbs. flour	5 16 5
836lbs. bran and pollard	2 8 9
	£8 5 2

The assumption, however, that the flour was of equal quality in the four grades is not in accordance with fact.

In the determination of the quality of a flour there are three factors which must always receive consideration, viz. :—Gluten content strength, and color.

In a flour of good baking quality all these points must be satisfactory. The sticky, elastic mass left when starch is thoroughly washed out of the dough made from wheaten flour is called "gluten." This gluten is comprised of two distinct proteid bodies—gliadin and glutenin. The former is soluble in a 75 per cent. solution of alcohol, whilst the latter is insoluble.

The gluten is an important constituent of the flour because of its proteid character, and because it is owing to the gluten that we are enabled to obtain a dough fit for baking purposes.

The following table indicates the gluten content of the various grades :—

TABLE IV.—*Gluten Content.*

Grade	Wet Gluten.	Dry Gluten.	Ratio.
	Per cent.	Per cent.	Wet : Dry.
I.A	25.73	9.27	2.76
I.B	25.91	9.24	2.71
II.A	22.3	8.1	2.87
II.B	23.86	8.25	2.89
III.A	22.49	7.9	2.85
III.B	22.77	7.92	2.87
IV.A	25.95	9.29	2.68
IV.A (duplicate).....	26.7	9.4	2.83

STRENGTH.

By strength of flour is usually meant the water absorbing capacity of the flour *i.e.*, the amount of water required to make a dough of definite consistency.

It is a most important property of a flour because the strength determines the yield in bread, and also determines the lightness in bread made from a given flour, and, in a large measure, the digestibility of the loaf. The strength was estimated by the determination of the water-absorbing capacity of the flour, and is usually stated in quarts of water required by a 200lb. sack of flour to produce a dough of a consistency fit for baking.

Table IV. gives the strength of the various grades.

TABLE V.—*Strength.*

Grade.	Quarts per 200lb. Sack.	Grade.	Quarts per 200lb. Sack.
I.A	48.9	III.A	48.0
I.B	49.0	III.B	48.1
II.A	48.5	IV.A	46.5
II.B	48.3		

These figures would appear to show that there is no necessary connection between the quantity of gluten and the strength of the flour, for Grade IV. has a higher gluten content than the other three grades; yet it is unquestionably the weakest flour. It has been suggested that the strength depends rather on the quality of the gluten than its quantity; but so far as the physical qualities of these four grades are concerned, there is little to choose between them. The gluten from each is very elastic, coherent, and slightly adhesive, with the exception of Grade III., the gluten of which was somewhat spongy and not so coherent as the other glutes.

Again, it has been supposed that the strength is related to the gliadin-glutenin ratio—where the glutenin preponderates the flour is strong, while the low glutenin-gliadin ratio is smaller for weaker flours.

To test this question the gliadin and glutenin of each grade were separated by dissolving the gliadin by prolonged contact with a 75 per cent. alcoholic solution. The following table gives the gliadin-glutenin ratio of the grades:—

TABLE VI.—*Gliadin and Glutenin.*

Grade.	From 40 Grs. Wet Gluten	Containing	
		Gliadin.	Glutenin.
	Grams	Per cent.	Per cent.
I.	10.32	42.51	57.49
II.	9.36	44.1	55.9
III.	9.08	42.93	57.07
IV.	10.47	42.44	57.56

These figures do not seem to support the suggestion that the glutenin-gliadin ratio is a measure of the strength. Though the percentage amounts of gliadin and glutenin do not seem to afford a criterion of the strength of the flour, it is quite conceivable that the physical properties of these proteids may do so; and of all the physical properties the water-absorbing power of these proteids is most likely to be associated with the strength. A special determination of the water-absorbing power of the glutenin and gliadin was therefore made, and with the gliadin this determination proved somewhat difficult. Tables VII. and VIII. give the details of the water absorption coefficients of the gliadin and glutenin.

TABLE VII.—*Gliadin.*

Grade.	Weight of Dry Gliadin.	Weight of Saturated Gliadin	Water Absorbed.	Water Absorption Coefficient.
	Per cent.	Per cent.	Per cent.	Per cent.
I.A . . . . .	.821	1.126	.305	37.03
I.A (dup.) . . . . .	.760	1.039	.279	36.61
II.A . . . . .	.701	.952	.251	35.8
II.A (dup.) . . . . .	.792	1.081	.289	36.5
III.A . . . . .	.526	.721	.195	37.2
III.A (dup.) . . . . .	.612	.837	.225	36.8
IV.A . . . . .	.781	1.058	.277	25.5
IV.A (dup.) . . . . .	.802	1.091	.289	36.1

TABLE VIII.—*Glutenin.*

Grade.	Weight of Dry Glutenin.	Weight of Saturated Glutenin.	Water Absorbed.	Absorption Coefficient.
	Per cent.	Per cent.	Per cent.	Per cent.
I.A	1.020	1.755	.735	72.1
I.A (dup.) . . . . .	.908	1.558	.650	71.6
II.A	1.131	1.932	.801	70.8
II.A (dup.)	1.004	1.725	.721	71.9
III.A . . . . .	.882	1.520	.638	72.6
III.A (dup.) . . . . .	.960	1.663	.703	73.3
IV.A	1.211	2.097	.886	73.2
IV.A (dup.) . . . . .	.896	1.548	.652	72.8

These tables reveal that the water absorption coefficient of the glutenin is considerably higher than that of the gliadin, and a comparison with the table of corresponding strengths will reveal that the glutenin-gliadin ratio is not a measure of the strength; nor, indeed, does the strength appear to be dependent in any way on the water absorption coefficients of the respective proteids.

COLOR.

The color of the flour is a very important consideration. The baker desires to make bread of a snow-white color, and his customers—the great army of bread-eaters—insist on the bread being of good color.

It does not necessarily follow that such color is associated with nutritive qualities. The nutritive quality of "brown bread" is well known. The consumer, however, will have white bread; the baker must produce such bread; and the miller must produce flour of color capable of making such bread, and so long as the bias of the customer lies in this direction so long must the miller be a slave to the production of good color in flour.

Pekar's method—described in a previous article—is commonly used for the detection of color. An examination of the samples of each grade revealed

scarcely any perceptible difference in the colors of the first three grades, which were all very good ; but Grade IV. was distinctly inferior, being dull and greyish in color.

BAKING TESTS.

An attempt was made to find out the baking values of each of the flours under consideration, as the quantity of bread yielded by a given weight of each flour and the volume of the loaf would afford a valuable test of the commercial value of the flour of each grade. Many attempts were made to conduct these baking tests in small ovens, but the results were uniformly unsatisfactory. An effort was then made to bake the bread in a large baker's oven. Mr. Eldridge, of the Walkerville Bakery, who has carried out many baking tests for the department, kindly undertook to superintend the baking of the loaves. Two loaves were made from 100 grains of flour of each of Grades I., II., and III. Unfortunately, there was insufficient flour from Grade IV. left over from other experimental work to permit of any baking tests to be performed with this flour.

The loaves were weighed four hours after baking and the volume and the density of the loaf determined. The following table represents the bread yield, volume, and apparent density of the loaf :—

TABLE IX.

Grade.	Bread Yield.	Weight of Loaf.	Density. $\frac{w}{v}$
	Per cent.	Per cent.	Per cent.
I.	142.29	275.9	.523
II.	140.54	272.3	.514
III.	137.47	259.2	.531

While it is difficult to generalise on the above figures, a survey of the table will, I think, reveal that on the whole the sample of wheat considerably above the f.a.q. standard are of greater actual monetary value than those samples of the same variety below the standard. They do, as a matter of fact, give a higher yield of flour, and therefore a given quantity of the high quality wheat gives milling products of higher value than the same quantity of lower quality wheat ; but, in addition, the quality of the flour from the higher grades is on the whole better than that of the lower grade wheats, and in the bakehouse the flour of the higher grade gives better results than that of the lower grade. Samples of wheat of high quality—uniform in size and of high bushel weight—may therefore be considered of more monetary value than the same variety of wheat of lower quality, and if quotations for prime samples of wheat are no higher than f.a.q. prices it is the consumer and not the producer who reaps the benefit.

(To be continued.)

"TAKEALL."

SERIOUS DAMAGE TO CROPS.

Report by the Acting Director of Agriculture.

The Acting Director of Agriculture (Mr. A. E. V. Richardson, B.A., B.Sc.) has forwarded the following report to the Minister of Agriculture on the question of the outbreak of takeall in Northern crops:—

"On October 27th, in accordance with the instructions of the Hon. the Minister, I went to Crystal Brook to investigate what was reported to be a serious outbreak of disease in the wheat crops. The members of the Agricultural Bureau met to discuss the cause, but could come to no decision on the matter, and the department was asked to make investigations on the spot.

"On arriving at Crystal Brook I was met by a number of representative farmers of the district, and we proceeded forthwith to some of the affected crops. One illustration will serve to indicate the seriousness of the disease. On a farm near Crystal Brook situated at the base of a gentle slope was a crop of Marshall's No. 3 wheat. The soil was chocolate loam, somewhat stony on the higher slopes, while the subsoil was composed of retentive clay. Both subsoil and soil were in perfect physical condition, moist, yet not saturated. No hot winds had been experienced so far, and it was therefore impossible to assume that the disease was due to mere blighting, *i.e.*, to a physiological defect in which transpiration through leaf and stem was unduly excessive. On this particular block of land 30bush. per acre had been reaped three years ago, so that it is reasonable to assume that it was in good heart. This season's crop looked and promised well up to the beginning of October, when the disease set in. The crop then looked good enough for 20bush., but at the end of October the plants had died off to such an extent that not a bushel per acre was expected from an area of 50 acres. In this particular crop, while the wheat plants had completely died off, wild oats, drake, thistles, and young stinkwort were quite unaffected. Deadly though the effect was so far as the wheat was concerned, it was apparent that other plants were quite healthy.

"On another farm 85 acres of splendidly-grown wheat, looking well enough for 25bush., had suddenly contracted the disease. In this instance the wheat was well out in head and was just flowering when the disease became apparent.

So rapid was the development that the heads began to rapidly whiten, just as if the plant's growth were suddenly arrested. Here, again, there were no defects in the condition of the soil to justify such an alarming development. Had the field been left probably the yield would have been decimated. The owner, however, realising the gravity of the situation, started to cut the whole block for hay. One interesting feature on this farm was the fact that though the whole of the wheat was affected and rapidly dying, a beautiful oat crop within a drill width of the affected area was absolutely free from any sign of disease.

"The two instances described above were certainly exceptional cases, as I subsequently discovered. They reveal, however, the extent to which the disease causes damage under favorable conditions. Generally, the disease occurred in patches from a few yards to a chain or so in diameter. On these patches the wheat died right out, whilst wild oats, thistles, and other weeds were unaffected. Occasionally, however, larger areas were affected, and in a few cases patches of one acre to ten acres were completely destroyed. In every case of the disease in the district which was brought under my notice the affected plants, on close examination, were found to carry the vegetative mycelium of the takeall fungus (*Ophiobolus graminis*). At the base of the affected plants, between the roots and the first node, a distance of an inch or two, the tissue of the stem was blackened with the growth of the fungus. In mild cases, or where the disease had just become apparent, only one or two stems of a plant were affected, whilst in more advanced cases the whole basal portion of the stems and the adjoining swollen roots were impregnated with the black sooty incrustation. Microscopical examination of the fungus growth revealed the vegetative mycelium and reproductive bodies (*perithecia*) of the takeall fungus (*Ophiobolus graminis*).

"As all the affected plants examined by myself, and the farmers who interested themselves in the work, revealed the presence of the fungus, and as all healthy plants near the affected areas were quite free from the black fungoid basal incrustation, it would be reasonable to conclude that the fungus was the cause of the disease. To be absolutely certain of the cause it would be necessary to raise seedling wheat plants in pots and impregnate them with the spores of the fungus and grow them under observation. If impregnated plants were then found to develop the same symptoms as those affected in the field we should be absolutely certain that such outbreaks of disease were caused by this specific fungus. This has been done on many occasions with previous outbreaks and the results show conclusively that the disease is caused by *Ophiobolus graminis*.

"To put the question beyond dispute a large number of affected specimens at various stages of growth were forwarded to Mr. D. McAlpine, the Vegetable Pathologist of Victoria, and he reports that the takeall fungus has been found on every specimen submitted, and was undoubtedly the cause of the disease.

SYMPTOMS.

" Before stating what may be done to mitigate the ravages of takeall, it would be as well to indicate the symptoms of the disease and the nature of the fungus we have to deal with.

" 1. The disease appears at all stages of growth. It may become apparent before the stalk is formed, and in such cases the leaves gradually turn yellow, the plant shrivels up and dies. At other times, again, it only becomes apparent after the wheat is in head. The heads suddenly whiten, as if they were blighting, the whole plant dies off, and the head consists merely of empty glumes. The disease attacks the plant at every stage of transition between the two instances quoted above.

" 2. The disease usually occurs in circular patches and frequently extends in concentric rings by attacking plants on the circumference of the ring.

" 3. In all cases the affected plants will reveal on close examination a blackened incrustation on the basal portions of the stem.

" 4. It is important to note that the fungus is no respecter of persons, methods of cultivation, types and conditions of soil. It is found in the crops of the careless and the careful farmer, on stubble land as well as well-prepared fallow, and on sandy, clayey, loamy, and limestone soils, old and new land.

NATURE OF FUNGUS.

" The fungus, in common with all others, has two stages of development—First, a vegetable stage, in which innumerable slender mycelial threads are produced, frequently penetrating both root and stem and drawing nourishment for its existence from the wheat plant; and second, a reproductive stage, in which flask-like spore cases (*perithecia*), containing the spores, are formed. When the spore cases mature the spores are set free and may remain in the soil to infect the future wheat crop. The fungus thrives on barley grass (*Hordeum murinum*) and spear grass, and it has been observed on barley. It is possible that many other plants may act as hosts. Oats, however, are immune from the attacks of the fungus, and this fact enables the farmer to starve the fungus out.

TREATMENT.

" Owing to the rapidity of development of the disease, and because it is only observed after the fungus has made considerable progress, little can be done to cure the disease directly. Much might be done, however, by way of prevention of the disease, directly by destroying the spores and indirectly by starving out the fungus. Various substances have been applied to the soil to destroy the spores. Amongst these may be mentioned bluestone, sulphate of iron, liver of sulphur, and perchloride of mercury. These, however, have resulted more or less unsatisfactorily. Theoretically, it might be expected that burning the stubble does much to mitigate the

disease by actually destroying large numbers of spores, and in practice it is found that wherever there has been a good stubble burn the resultant crops are free from takeall. We must not, however, be too sanguine about the matter, as it is scarcely conceivable that an ordinary stubble fire would destroy such spores as are on the underground parts of the stem and roots. The most practical method of prevention would appear to be to resort to the method of starving out the fungus. This is comparatively easily done if it is borne in mind that the fungus can live on spear grass and barley grass, which forms so large a part of many pastures in the North, and that it cannot live on an oat plant. Farmers suffering badly from takeall this season are, therefore, earnestly advised to fallow the affected areas early next season, keep down by cultivation the plants or weeds that may act as a host for the parasite, and substitute a crop of oats in place of the usual wheat crop. The spores left in the soil from the diseased wheat crop are encouraged to germinate by the process of fallowing, and if the fallows be kept free from possible host plants, the spores that germinate die out. A great many spores will pass through the season without germinating, but would possibly be encouraged to germinate in the succeeding year. The oat crop now occupying the land does not act as a host, and the spores that have germinated must necessarily perish. If then the land is fallowed up again after the oat crop is reaped and wheat is sown after the fallow, it is reasonably certain that the takeall on that particular section will have been eliminated.

“ The preventive treatment consists, therefore, in adopting a sort of rotation of crop as follows :—

- 1910.—1. Wheat (badly attacked by takeall).
- 1911.—2. Early and well-prepared fallow.
- 1912.—3. Oats.
- 1913.—4. Early fallow.
- 1914.—5. Wheat.

“ This rotation might, of course, be modified as follows :—

1. Wheat.
2. Early fallow.
3. Oats (grazed).
4. Oats (sown on stubble land for reaping).
5. Fallow.
6. Wheat.

“ The principle underlying all preventive measures, however, is exceedingly simple ; it consists of starving out the fungus—

1. By inclusion of an oat crop in the rotation.
2. By preventing any host plants from growing on the fallows, and the principle may be modified by the ingenuity of each individual farmer to suit the exigencies of his local conditions.

OCCURRENCE OF TAKEALL.

" Since the Crystal Brook outbreak I had an opportunity of visiting a number of agricultural districts, and found that the disease is very prevalent, and in some cases has done considerable damage this season.

" 1. Much damage has been done along the coastal plains from Port Wakefield to Adelaide, particularly in the hundreds of Inkerman, Balaklava, Dublin, Goyder, and Mudla Wirra.

" 2. On Yorke's Peninsula large areas have been affected in the hundreds of Wallaroo, Tiparra, Maitland, and Kulpara.

" 3. From Port Pirie to Port Broughton, along the coastal plains between these two centres, the disease has been perhaps worse than in any other centre, and particularly severe have been the outbreaks in the hundreds of Wandearah, Napperby, Crystal Brook, Narridy, and Mundoora.

" 4. On the stretch of plains from Laura to Booleroo Centre, Fullerville, Melrose, and Wilmington large areas have been affected.

" 5. In the Upper North, from Quorn to Orreroo, takeall outbreaks have been observed, but they have not been so serious as the outbreaks in the Port Pirie district.

" 6. Eyre Peninsula has suffered slightly from the disease. The hundreds along the Port Lincoln railway have been slightly affected, but severe outbreaks have been noted around Tumby Bay.

NEED FOR A PATHOLOGIST.

" It would be futile to try to estimate the loss this season or any other season due directly to the ravages of this fungus. It is certain, however, that the figures, if they could be obtained, would be startling in their intensity. Only those that make a rapid journey through our agricultural areas during the ripening season can adequately appreciate the great annual loss that must result from the activity of the fungus. When we consider, too, the amount of wheat killed by other fungoid diseases, particularly loose smut, flag smut, rust, and bunt, it is obvious that we are far from reaching that ideal stage of progress when the agriculturist is able, by suitable preventive measures, to subdue these fungoid pests. There is a wide field of investigation and research for a pathologist in South Australia, and his services would be of immense value to the primary producers of this State. It is safe to say that on an average at least 10 per cent. of the crop is taken annually by such fungoid pests as rust, loose smut, flag smut, bunt, takeall, and even at this low estimate we are losing on last year's figures nearly half a million of money a year.

" But valuable as a vegetable pathologist would be in relation to cereal pests, he would be of great assistance in coping with Irish blight, which threatens to seriously interfere with the profitable potato industry. Equally

valuable, too, would be his services in the horticultural section of departmental work, and a single example—bitter pit—will be sufficient to indicate his usefulness here. In the past South Australia has relied on the generosity of the Victorian pathologist (Mr. D. McAlpine), but the time has come when the Agricultural Department of this State needs a pathologist attached to the staff. The agricultural resources, the magnitude of the agricultural interests, and the annual loss through ravages of fungoid pests more than justify the immediate appointment of a qualified pathologist to assist the producers of this State. Without such a man the work of the department cannot reach its maximum efficiency. New South Wales has a staff of micro-biologists and pathologists working as a Bureau of Micro-biology in co-operation with the New South Wales' Department of Agriculture. Even Western Australia, at this comparatively youthful stage in her agricultural history, has provided for the appointment of a skilled pathologist; and it surely behoves South Australia at least to come in line with the other States and secure such a man without delay."



THE WHEAT CROP.

Official Forecast—Probable Average, 11'91 Bushels.

The Government Statist (Mr. L. H. Sholl) and the officials of his department have completed their estimate of the wheat and hay harvest for the season 1910-11, and the actual figures for the past season and the estimated ones for the present season are given in the tables on the following pages. The totals for the State are shown below alongside the estimates of the daily papers.

1910-11.	Government Statist, Dec. 1, 1910.	<i>The Advertiser</i> , Nov. 11, 1910.	<i>The Register</i> , Dec. 1, 1910.	<i>The Daily Herald</i> , Nov. 15, 1910.
	Acres.	Acres.	Acres.	Acres.
Area under crop	2,435,060	2,334,857	2,269,320	2,430,000
Area to be reaped for wheat..	2,045,890	1,984,857	1,915,000	—
Area to be cut for hay	389,170	350,000	354,300	—
	Bushels.	Bushels.	Bushels.	Bushels.
Aggregate wheat yield	24,375,835	22,963,194	21,543,750	21,000,000
Average per acre	11'91	11'34	11'16	—
	Tons.	Tons.	Tons.	Tons.
Aggregate hay yield	543,200	—	496,048	—
Average per acre	1 ton 8 cwts.	—	1 ton 8cwts.	—

When he delivered the Budget Speech in September the Treasurer predicted a total yield of 30,000,000bush., an increase of 20 per cent. on the previous year's harvest, and at that time most people agreed that the estimate was not excessive. All preconceived ideas, however, respecting what was to have been a record crop have been rudely dispelled by the appearance in many parts of the State, but chiefly in the Lower North and the Central districts, of the mysterious disease known as "takeall." Probably in no previous year have the ravages of this disease been so severe. In some paddocks entire crops, which promised some weeks previously to give a return of 20bush. or 30bush. to the acre, have been completely destroyed. An interesting report on "takeall" by the Acting Director of Agriculture is published in this month's issue.

The Government Statist's report shows that, although the acreage under wheat is 55,909 acres larger in the Central District and 15,007 acres larger in the Lower North District than the areas cropped last year, the estimated production of grain is less by 894,105bush. and 1,441,986bush. respectively, resulting in decreased averages of 2'09bush. and 2'76bush., as compared with the actual results last year. The other districts show fair increases in the acreage and probable yield. The South-Eastern District, for instance, which includes Pinnaroo, is estimated to have 81,727 additional acres under wheat, and an increased yield of 833,093bush.

ESTIMATE OF THE WHEAT HARVEST, 1910-11.

Estimate of the Area under Wheat, and the Probable Yield of Grain and Hay for the Season 1910-11, also the Actual Area and Yield for the Season 1909-10.

Counties.	Area Under Wheat.						Yield.				Average Grain per Acre.	
	Actual Area, 1909-10.			Estimated Area, 1910-11.			Actual, 1909-10.		Estimated, 1910-11.		Actual, 1909-10.	Estimated 1910-11.
	Total.	Grain.	Hay.	Total.	Grain.	Hay.	Grain.	Hay.	Grain.	Hay.		
											Acres.	Acres.
I. CENTRAL —												
Adelaide	54,226	14,306	39,920	56,000	15,500	40,500	205,884	65,942	189,800	59,500	14.39	12.25
Albert	51,927	47,449	4,478	59,100	53,000	5,500	502,290	4,818	522,500	6,500	10.59	9.75
Alfred	32,433	29,252	3,181	50,000	40,000	10,000	349,507	3,884	480,000	15,000	11.95	12.00
Carnarvon	2,284	2,066	218	2,950	2,700	250	12,180	267	11,500	275	5.90	4.26
Eyre	67,674	56,361	11,313	70,600	61,500	9,100	572,749	11,508	593,500	10,500	10.16	9.65
Fergusson	147,188	137,478	9,710	157,800	142,500	15,300	2,004,721	13,146	1,845,500	21,000	15.02	12.95
Gawler	145,123	117,202	27,921	150,500	116,500	34,000	1,977,456	47,866	1,601,800	65,500	16.87	13.75
Hindmarsh	28,253	22,330	5,923	29,000	22,000	7,000	299,185	8,816	226,500	7,500	13.40	10.30
Light	127,289	93,173	34,116	133,500	95,000	38,500	1,022,477	52,696	1,353,700	58,500	17.41	14.25
Sturt	79,144	66,617	12,527	82,000	64,500	17,500	725,456	14,442	613,000	20,000	10.89	9.50
Total	735,541	586,234	149,307	791,450	613,800	177,650	8,331,905	223,385	7,437,800	264,275	14.21	12.12
II. LOWER NORTH —												
Burra	26,703	21,262	5,441	28,810	25,550	3,260	311,682	5,466	361,000	4,500	14.66	14.13
Daly	251,199	227,457	23,742	257,000	224,500	32,500	3,521,005	33,616	2,739,000	43,500	15.48	12.20
Hamley	822	40	782	850	50	800	200	865	300	850	5.00	6.00
Kimberley	14,491	12,371	2,120	16,870	14,870	2,000	114,524	1,748	156,135	2,150	9.26	10.50
Stanley	177,189	153,114	24,075	185,300	159,800	25,500	2,892,396	37,068	2,490,500	35,800	18.89	15.59
Victoria	167,062	137,176	29,886	193,500	133,000	30,500	2,261,669	47,528	1,908,700	51,500	16.49	14.35
Young	3,867	3,555	252	3,950	3,600	350	25,085	219	29,000	250	7.06	8.00
Total	641,273	554,975	86,298	656,280	561,370	94,910	9,126,621	126,510	7,684,635	138,550	16.45	13.69

ESTIMATE OF THE WHEAT HARVEST, 1910-11—continued.

Estimate of the Area under Wheat, and the Probable Yield of Grain and Hay for the Season 1910-11, also the Actual Area and Yield for Season 1909-10—continued

Counties.	Area under Wheat.						Yield.						Average Grain per Acre.
	Actual Area, 1909-10.			Estimated Area, 1910-11.			Actual, 1909-10.			Estimated, 1910-11.			
	Total.	Grain.	Hay.	Total.	Grain.	Hay.	Grain.	Hay.	Grain.	Hay.	Grain.	Hay.	
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Bushels.	Tons.	Bushels.	Tons.	Bushels.	Tons.	
III. UPPER NORTH—													
Blackford	10,260	9,205	1,055	12,350	11,250	1,100	65,980	854	88,800	1,200	7-17	7-89	
Dalhousie	101,061	87,891	13,170	109,000	93,500	15,500	936,160	14,234	1,051,500	20,500	10-65	11-25	
Derby	—	—	—	—	—	—	—	—	—	—	—	—	
Frome	117,910	100,202	17,708	124,500	108,000	16,500	1,320,864	23,958	1,480,000	22,500	13-18	13-70	
Granville	17,182	15,955	1,227	18,050	15,500	2,550	119,000	1,018	112,500	3,500	7-46	7-26	
Hanson	22,867	21,098	1,769	23,300	18,200	5,100	187,931	1,588	130,500	5,500	8-91	7-17	
Herbert	7,009	6,612	397	7,250	6,550	700	45,298	307	50,500	700	6-85	7-71	
Lytton	34	—	34	—	—	—	—	22	—	—	—	—	
Newcastle	22,416	19,104	3,312	24,400	20,500	3,900	197,916	4,523	225,000	6,500	10-36	10-98	
Taunton	143	23	120	150	50	100	200	110	450	100	8-70	9-00	
Total	298,882	260,090	38,792	319,000	273,550	45,450	2,873,349	46,614	3,139,250	60,500	11-05	11-48	
V. SOUTH-EASTERN—													
Buclench	30,438	28,119	2,319	44,350	36,850	7,500	228,831	1,803	353,000	7,000	8-14	9-58	
Buckingham	25,800	24,584	1,216	33,300	29,500	3,800	222,898	1,003	304,800	3,700	9-07	10-33	
Cardwell	2,093	1,966	127	3,300	3,000	300	12,567	61	27,000	350	6-39	9-00	
Chandos	96,473	87,641	8,832	145,000	128,500	16,500	1,141,150	9,332	1,740,500	25,850	13-02	13-54	
Grey	8,517	7,518	999	8,650	7,800	850	116,291	1,548	112,800	1,500	15-47	14-46	
MacDonnell	6,490	5,875	615	6,950	6,200	750	55,171	493	51,500	700	9-39	8-31	
Robe	4,813	4,318	495	5,050	4,500	550	46,110	458	50,500	550	10-68	11-22	
Russell	23,249	21,341	1,908	33,000	28,500	4,500	204,489	2,043	220,500	5,000	9-58	7-74	
Total	197,873	181,362	16,511	279,600	244,850	34,750	2,027,507	16,741	2,860,600	44,650	11-18	11-68	

V. WESTERN—											
Burton	78	2	76	180	120	60	68	140	2,400	60	34'00
Duffryn	5,900	5,269	631	6,550	6,000	550	46,399	400	54,500	350	8'81
Flinders	72,375	64,835	7,540	81,000	69,500	11,500	520,808	7,547	550,000	13,000	8'03
Hopetoun	7,800	7,389	411	9,350	8,800	550	67,585	310	72,500	400	9'15
Jervois	79,873	73,221	6,652	99,000	88,500	10,500	797,921	7,943	878,000	11,000	10'90
Kintore	22,763	21,786	977	23,600	22,500	1,100	136,192	815	165,800	800	6'25
Le Hunte	386	290	96	400	300	100	2,700	92	2,400	75	9'31
Manchester	140	90	50	150	100	50	750	76	750	40	8'33
Muggrave	18,115	15,285	2,830	20,000	17,500	2,500	136,019	2,409	145,000	2,100	8'90
Robinson	63,565	59,099	4,466	70,500	66,500	4,000	523,004	4,448	745,600	3,700	8'85
Way	69,341	65,811	3,530	78,000	72,500	5,500	543,023	2,709	636,000	3,700	8'25
York	30	—	30	—	—	—	—	30	—	—	—
Total	340,366	313,077	27,289	388,730	352,320	36,410	2,774,469	26,219	3,253,550	35,225	8'86
SUMMARY.											
I. CENTRAL	735,541	586,234	149,307	791,450	613,800	177,650	8,331,905	223,385	7,437,800	264,275	14'21
II. LOWER NORTH	641,273	554,975	86,298	656,280	561,370	94,910	9,126,621	126,510	7,684,635	138,550	16'45
III. UPPER NORTH	298,882	260,090	38,792	319,000	273,550	45,450	2,873,349	46,614	3,139,250	60,500	11'05
IV. SOUTH-EASTERN ..	197,873	181,362	16,511	279,600	244,850	34,750	2,027,507	16,741	2,860,600	44,650	11'18
V. WESTERN	340,366	313,077	27,289	388,730	352,320	36,410	2,774,469	26,219	3,253,550	35,225	8'86
Total	2,213,935	1,895,738	318,197	2,435,060	2,045,800	389,170	25,733,851	439,469	24,375,835	543,200	13'26
Increase	—	—	—	221,125	150,152	70,973	—	—	—	103,731	—
Decrease	—	—	—	—	—	—	—	—	758,016	—	1'35

L. H. SKOLL, Government Statist.

Statistical Office, Adelaide, November 30th, 1910.

PARAFIELD SEED WHEATS.

By A. E. V. RICHARDSON, B.A., B.Sc.

Last season the demand for Parafield seed wheat was considerably in excess of the supply, and many orders for seed had to be held over.

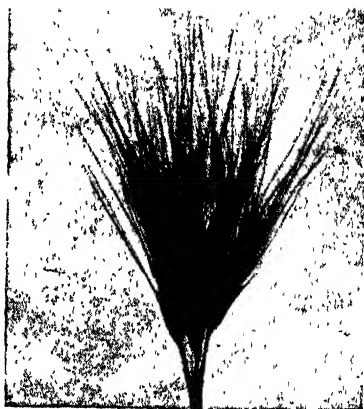
To acquaint readers of the *Journal* with the varieties of wheat available for distribution this season and their principal characteristics the following short notes have been prepared.

It would be well to point out that, owing to the small area available at Parafield for raising seed wheat, only small orders can be booked. Varieties of the following wheats can be obtained from the department in limited quantities:—Federation, Yandilla King, Special Comeback, Cumberland, American No. 8, Medeah, Huguenot, White Tuscan, Triumph, Cedar, Genoa, Firbank, Bayah, Thew. Special pains have been taken with these varieties to obtain them specially pure by continuous hand selection. The following varieties are also for distribution:—Marshall's No. 3, King's Early, Dart's Imperial, Gluyas, Bunyip, Crossbred 53, and though we cannot offer the same guarantee of purity as with the former, still every care has been taken to secure uniformity of type by carefully hand-picking the plots.

Rust undoubtedly seriously interferes with the capacity of a plant for forming well-filled grain, but it is probable that hot winds and dry spells in the aggregate do more damage than rust over a period of years by premature ripening and preventing the formation of plump grain.

Special interest attaches, then, to the early varieties, because these are likely to be of special value in our drier districts. These are Thew, Cumberland, Bunyip, Cedar, King's Early, Gluyas, Firbank, and Comeback.

1. *Thew*.—One of the earliest wheats of the group, a vigorous grower, tall, and a good stooler. Its extreme earliness enables it to escape rust. Head beardless, white chaff, medium length, open in character, but does not shake out. It is of fair milling quality, and has proved a very suitable variety for hay in New South Wales.



MEDEAH.

2. *Cumberland*.—This is another remarkably early wheat, and is a purple straw cross. A parcel of Parafield seed has given splendid results at the Veitch's Well Experimental Farm. It is wheat only fair milling in quality, and is fairly suitable for hay. It is beardless, white chaff, vigorous growing wheat, fair stooler, and usually holds its grain well. This season it has been materially affected with rust, and has shaken out rather badly.



THEW.



CUMBERLAND.

3. *Bunyip*.—A very early variety, medium tall, vigorous grower, fairly erect, with strong straw. It is not a rust-resister, but ripens early enough to escape severe injury from this disease. Fairly long substantial head, white

chaff, does not readily shell, of good milling quality, and yields a flour of high strength.

4. *Cedar*.—An early variety of moderate height and stooling capacity. The grain is of excellent quality, being red, hard, and of high strength. It is fairly rust-resistant, and has the reputation of being bunt-resistant. It



BUNYIP.



KING'S EARLY.

is difficult to strip, as the grain is held very tenaciously. It is a crossbred variety, with Manitoban and Indian parentage. The ears are beardless, white, tapering at the tip.

5. *King's Early*.—A very popular early variety, with a beard of moderate length. It has a straw semisolid in character, sweet, and retains its color

well, and is therefore largely grown for hay. It suffered very badly from loose smut this year at Parafield, and in places has gone down rather badly. It is a good all-round variety, and its rapidly-maturing qualities make it of special value in a rusty season.

6. *Comeback*.—This variety is of the very highest value as a milling wheat. The millers who have ground it speak in unqualified terms of praise concerning its value as a high-quality wheat.



SPECIAL COMEBACK.



FIRBANK.

A premium of 3d. to 6d. per bushel used to be offered for samples of *Comeback*, and this still obtains with certain mills in New South Wales. If this variety were more largely grown, and millers could be guaranteed a regular supply, the prices of this wheat would undoubtedly advance. It has had

the reputation of being a shy yielder, but in some districts it has done remarkably well. It topped the list of varieties at Hammond last season, and has been a consistently good yielder. It is a vigorous grower, early, fairly rust-resistant, good stooler, with tall, clean straw, and makes a very good sample of hay. The head is of medium length, beardless, smooth, and white, but the tip of the head is defective.



7. *Firbank*—A cross between *Zealand*—a good hay wheat—and a cross-bred *Maffra*. It is a very early variety, a good hay wheat, with soft straw of excellent color and quality. *Firbank* suffered considerably from rust this season. It is a tall grower; stools moderately. The ears are long, open, and have a tapering tip. The chaff is smooth and white.

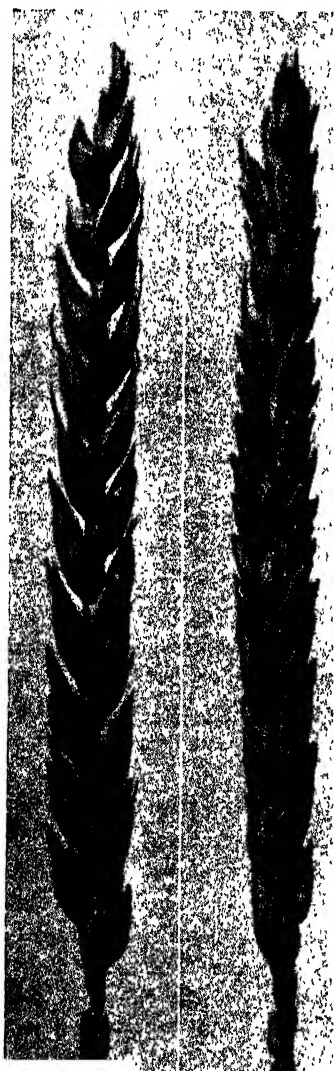
8. *Gluyas*.—An early variety, very popular in the Northern districts, principally on account of its immunity from disease, and particularly its rust - resisting powers. One serious objection to *Gluyas* is, however, its tendency to go down, particularly in heavy weather. It is a fair stooler and vigorous grower, with weak straw. The heads are beardless, bronzed, and pendent, and hold the grain well.

9. *Bayah*.—A fairly early variety, with straw of moderate length, stands up well, and the mature crop closely resembles *Federation* in the color of chaff and short upstanding straw. The spikelets are set more closely together, and the head is better at the tip than *Federation*. It is a *Jonathan* cross, with improved *Fife* parentage. Like *Federation*, it is unsuitable for hay on account of the short straw, but it promises to be a good yielder.

10. *Federation*.—This is the most popular variety grown in the Commonwealth to-day. It was produced by the late Mr. Farrer from a cross between *Purple Straw* and *Yandilla*. *Yandilla* is a cross between *Improved Fife* and *Etawah*, an Indian variety. It has proved to be one of the most prolific varieties in general cultivation. In the field it does not possess an attractive appearance, and on appearances alone it would never have become a popular variety. Most farmers on growing it for the first time have expressed great surprise at the yielding capacity when the wheat was taken off, for the yield has invariably exceeded the expectations based on the preharvest appearances. As a matter of fact *Federation* is one of the wheats deliberately created by Mr. Farrer to suit the Australian methods of harvesting with the stripper. It has a short, upright, strong straw, unaffected by some of the most violent storms. It may be regarded as a variety in which there is the maximum of grain to the minimum of straw. Its chief feature is its extraordinary prolificacy. It was not intended for nor recommended as a hay wheat. It is essentially a grain-yielder. The head is square, with a peculiar and characteristic bronze cast, upright, beardless, and, while easy to strip, the grain does not readily shake out. The foliage of the young plants has a characteristic light-green color, and possesses upright, broad, stiff, pointed leaves. It is susceptible to rust, and has suffered considerably at *Parafield* this year. It is a midseason wheat, and is regarded by the majority of farmers in the drier Northern Areas as rather late, compared with *Gluyas* and *Carmichael's Eclipse*. Were it a little earlier and more disease-resistant it would be regarded as an ideal type of wheat for our great Northern Areas. Though not of such high milling quality as *Comeback* and *Bobs*, still it yields a large percentage of flour of good color and fair strength, and is comparatively easy to mill.

11. *Yandilla King*.—A late wheat, with good stooling propensities; upright, stiff straw. It has done remarkably well in this State, and has, with *Federation*, been regarded as one of the most prolific varieties in general cultivation. The heads are large, well developed, beardless, and white, and

hold the grain well. It is a cross between Yandilla and Silver King. Yandilla was produced by crossing Improved Fife with an Indian variety—Etawah. It is a deservedly popular wheat, and has done well in departmental tests.



YANDILLA KING.



GENOA.

12. *Genoa*.—This is a later variety, with good stooling propensities and upright straw. As a hay wheat it shows considerable promise. It is a vigorous grower, of medium height, and, like Cedar and Florence, it is

supposed to be bunt-resistant and probably bunt-proof. These varieties represent Mr. Farrer's efforts to produce smut-resisting wheats, and their introduction indicates that pickling of seed wheat for prevention of bunt may in the near future be dispensed with.

13. *Huquenot*.—A very tall grower, but a sparse stooler. It is an upstanding, practically solid straw, very sweet in character. If sown too thinly, the



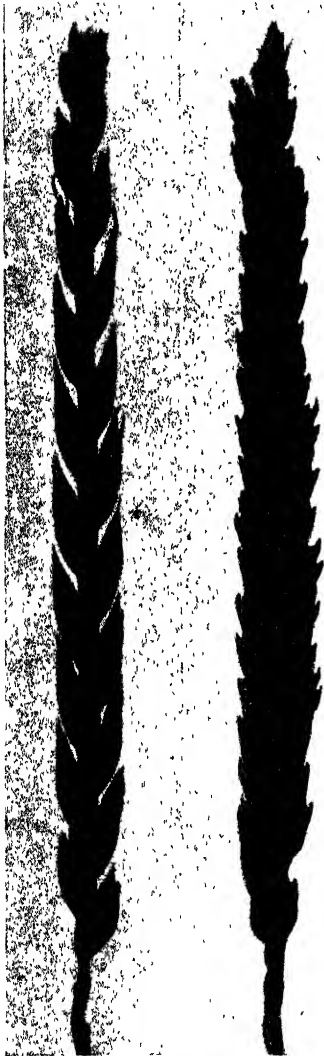
HUGUENOT.



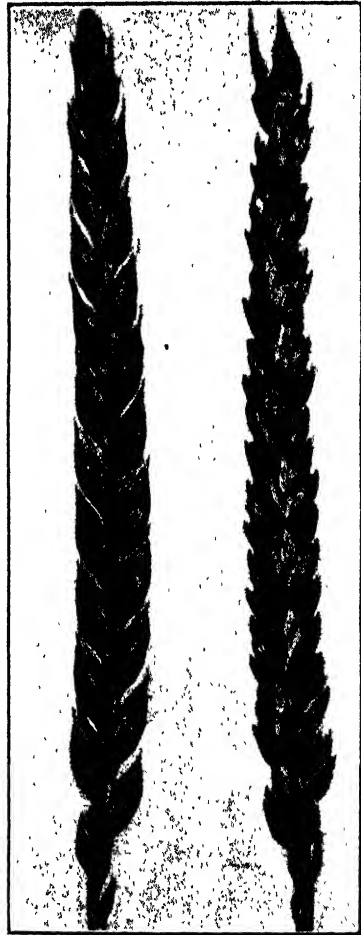
GLUYAS.

growth resembles a plot of miniature bamboos. It belongs to the Macaroni type of wheat, possessing high gluten content, considerable strength, but the color of the flour is very inferior, and it is therefore objectionable to the miller and baker. The ear is purplish black, like that of Medeah, but it is beardless. It is said to have been introduced by Mr. J. Correll, of Western Australia. It is rust-resistant and smut-resistant, and its chief value is for

fodder, either for hay or ensilage, as it gives a most prolific cut. It is a hardy grower, and needs to be sown rather thickly to secure a good sample of hay. Quite a large area of this variety is now grown in the State, and it is generally regarded as one of the most prolific hay varieties in general cultivation.



MARSHALL'S No. 8.



AMERICAN No. 8.

14. *Medeah*.—Like Huguenot, this belongs to the Macaroni class of wheats, and is a tall-growing, late variety, stooling rather sparingly. The straw, like Huguenot, is practically solid, but coarse in character, sweet, and bearing

very prominent nodes. It is difficult to strip, particularly when it grows rankly, and owing to the pendent character of the ripe heads and the prominence of the last node, which frequently causes the stripper to choke. It is a splendid variety to sow for the production of a heavy crop of green



WHITE TUSCAN.



TRIUMPH.

fodder or ensilage, but for hay it is unsuitable, on account of the relative coarseness of the straw and the heavy bearded heads. The difficulty in stripping a crop of Medeah—particularly where it is liable to grow rank and

tall—may be obviated by sowing it early in the season, then grazing the young plants and allowing the second growth to mature for grain. The heads are compact, the spikelets densely crowded, and brown or black in color, with long, angular, horny grain. It is a very hard variety, smut-resistant and rust-resistant; but it is unsuitable for milling on account of the bad color of the flour.

15. *Marshall's No. 3*.—This is a late wheat of good tillering capacity and usually of medium height. It has since its introduction been exceedingly popular, being largely grown in this and other States. It is regarded as fairly rust-resistant, but its late maturity prevents it being of much use in the drier districts. The straw, when ripe, is purple in color, stands up well, and bears a head of medium size, beardless, and rather open. The wheat is of fair milling quality, the flour being of medium strength and good color.

16. *American No. 8*.—A vigorous variety, of good stooling capacity; one of the best varieties obtained from the United States. Good hay wheat, splendid straw, fairly rust-resistant. In the tests at Parafield it has done well as a grain and hay yielder, and when quite acclimatised it may prove to be a most prolific variety. It is medium late, with upstanding straw, narrow but long, the head possessing numerous brown spikelets. The grain is plump, dark, hard, red, of good milling quality.

17. *White Tuscan*.—A very popular hay wheat, rather late, with good stooling propensities and good color straw of fine quality. The head is rather open, beardless, white, and possesses a characteristic tapering tip. In the departmental plots at Aldinga for 1908 and 1909 White Tuscan headed the list both for hay and grain each season, averaging $3\frac{1}{2}$ tons of hay and 25 bush. of grain. Mixed with Calcutta Cape oats it makes an excellent sample of nutritious hay.

18. *Triumph*.—A midseason variety of good tillering capacity, strong, tall, vigorous grower, with good straw and flag. Large head with spikelets rather open, beardless, white chaff, medium hard white grain of fair milling quality. It is a very good hay wheat, yielding a heavy cut of fine quality hay, and a fair grain-yielder, but rather liable to rust.

The foregoing list indicates the varieties grown for distribution at Parafield for this season. Some of these wheats, *e.g.*, Genoa, Cedar, Firbank, Thew, and Bayah, are new to South Australian farmers, and were obtained from the Department of Agriculture of New South Wales because they are likely, according to the published descriptions, to be of use to South Australian growers. Most of the other varieties are familiar to South Australian farmers, with the exception of American No. 8, which promises to be of some value. A special effort has been made to secure a fairly large amount of Special Federation and Comeback seed on account of the large demand for these two varieties last season.

THE PREPARATION OF HONEY FOR MARKET.

By T. E. WHITE LAW.

A matter of importance which beekeepers have to consider during the honey season is the best methods to adopt in preparing the honey for market. It is here where the beekeeper with an aptitude for business comes to the front and disposes of his produce readily. He realises that steady, continuous sales depend on the production of an even quality of honey, packed in the best possible fashion, which can be passed on for human consumption with a minimum amount of labor on the part of the retailer. In these days of strenuous competition preparation is a very essential point--to provide a first-class article in a clean, attractive receptacle. When it meets the eye of a purchaser its appearance creates a good impression, which is further enhanced when the contents are in accord with the external embellishments.

To market honey in second-hand tins reduces its chances of obtaining a good price. The excuse is there for the buyer to cut the price, and usually he avails himself of it. The liquefying of candied honey in such tins is more precarious, for when heated they are liable to leakage. Honey that is worthy of a tin is worthy of a clean, bright one. It is true that by tinning honey in second-hand tins the beekeeper will save money on the actual cost of the tins, but I venture to think that this is counterbalanced by loss in other directions. Firstly by the extra labor which the cleaning of these tins entails—it being a matter of some difficulty to thoroughly cleanse them; secondly, by a slightly-reduced price for the honey they contain, and the general tendency which such action has to keep the prices in the honey trade at a low figure. Honey prices in the past have suffered through the want of preparation on the part of some beekeepers; and if prices are to be improved it will only be by the combined effort of every beekeeper to improve the preparation of this commodity. One has only to look at the honey produced in the apiaries of our leading beekeepers to learn one reason of their success. Owing to their care in the above-mentioned direction, and their integrity in the matter of an honest description as to the actual quality of their honey, it sells easily, and at a good price. The encouragement which has been given to the beekeeping industry by the action of the Government Produce Department in exploiting South Australian honeys outside the Commonwealth, and incidentally in fixing a high standard for export honey, has assisted in greatly improving the honey sales.

From the beekeepers' point of view the honey trade of South Australia is largely in bulk, though they cater for the retail trade through the medium

of their co-operative union ; but even this means that the apiarist delivers his honey to the central depot in bulk in 60-lb. tins.

Too much care cannot be taken in grading honey when extracting from the hives, and the various types of honey should be extracted as far as possible separately, more especially with regard to color, as a small quantity of dark honey mixed with a lighter type lowers the market price of the latter. This means a little additional labor when extracting, but the production of a higher grade honey compensates for this.

The value of honey from a commercial standpoint depends on a combination of the following characteristics—color, flavor, density, condition, and aroma, enumerated in the order of their importance. Appearance and taste are the principal points by which the value of honey is fixed. In gauging the value of honey *as a food*, the inferior grades are often quite equal, and in some instances are superior, to those in the higher grades ; but the fact that they are dark and have not such excellent flavors renders their value much less on the market. Good work can be done by blending, if it is done judiciously and certain important points observed. As a general rule, the improvement of dark honey by the addition of a light honey is not a practical business proposition. The blending of two honeys equal in color, one of which has a poor flavor, will often improve the market value ; but the result is best determined by judicious experiment before carrying out the process in bulk. The blending of dark or medium-colored honeys often causes a marked improvement in the matter of flavor, and a marketable honey is produced.

The question as to the ripeness of honey is an important one, which at various times has been the cause of much controversy in various parts of the world ; but on one point at least beekeepers are in accord, agreeing that honey for the market must be fully ripe, having plenty of density. The question whether it should be ripened naturally in the hives or removed while thin and green to be ripened artificially by mechanical process will not be discussed here, beyond stating that the consensus of opinion appears to be in favor of honey ripened in its natural environment—the hive—as it is incomparable in the matter of color, flavor, and keeping qualities. In the past many consignments of unripe honeys have been put on the market to be purchased and stored by the buyers, who, on examining it after storage, have discovered the tins blown out and the honey in a state of fermentation. In some cases it has even been retailed in this condition, causing the public to take aversion to the so-called honey. On the other hand, the buyer has, perhaps, preferred to pocket the loss, but invariably with the fixed determination to allow sufficient margin on his next purchase to cover this possibility. Honey which is thin, containing a high percentage of moisture, has a lower food value, as the water takes the place of the nourishing sugar,

One of the best tins to use is the one with crimped edges—its only disadvantage being that it is much more difficult to stack one above the other. The use of building laths between the layers overcomes this trouble, enabling the stack to be built regularly and with no danger of the tins being pierced. The latter danger is considerably less, as the edges and corners are rounded, and not sharp like those of the square-cut tins. The small space beneath the tin caused by the crimped edge raises the tin from the ground, and assists in preventing the rusting and decomposition of the tins. To stack tins on the ground which has a few droppings of honey about causes the rapid rot of the tin, due to the combined action of air, dampness, and the honey. The use of thick dunnage at the bottom of the stack prevents this. When liquefying honey, the heat sometimes causes the stud top to leak, and the crimped edge retains any honey that flows out.

Stud-top tins are to be preferred to the lever top, for during the process of liquidation, should a tin be discovered leaking, the leak can be turned uppermost, which cannot be done with safety with a lever-top tin. A lever top presents an accessibility to the honey which facilitates the process of grading, and also presents a golden opportunity for unauthorised individuals with tasting propensities, unless soldered, which is invariably necessary for safe travelling. They also harbor dirt and grit, which works into the honey when the tops are opened and replaced for examination.

Honey, after it is tinned off, should be carefully soldered down and stacked away in a warm, dry place. An open paddock is not an ideal place for a stack of tins, even if well covered, as their future appearance when marketed is apt to suffer.

When sending in a large quantity of honey which varies in quality, each type should have a very distinct mark, so that each sample can be examined by itself. The tins containing different classes of honey should be distinctly marked, so that the grader can immediately sort them into separate groups and examine each class by itself, with no confusion of flavors. When a grader has to examine a large consignment of honey of various types mixed indiscriminately, the work is very exacting. The dodging from one flavor to another, especially when some of the tins contain honey with a very strong flavor, necessitates the greatest care to preserve the acute sense of taste which is necessary to obtain true grading. If, however, each consignment arrived with the tins branded with a distinct mark, each type would be examined by itself, and the work would be much simplified.

The question of freight is an important one to the beekeeper. At the present time the cost of freight is a check to the beekeeping industry, for there is no encouragement to a beekeeper to go out into the back blocks to open up districts which are suitable for keeping bees. The cost of getting the honey and materials to and from Adelaide, with the cost of production,

leaves insufficient margin to render it a profitable speculation at prices obtained for the honey. Many spots in South Australia are therefore neglected and undeveloped, from a beekeeping point of view, through this reason, and the majority of beekeepers are found congregated in the districts around Adelaide, when many places admirably suited for beekeeping farther away remain neglected. Examining the conditions that exist with regard to this matter in other countries we find that beekeepers are offered special facilities in the matter of freight, honey being carried at half rates, and the empty tins and cases are conveyed to beekeepers at special charges on the condition that they are returned full.

FRENCH GLACE FRUITS.

[The following extracts from report of the American Consul at Marseilles will be of interest to fruit-preservers. The statements are made by one of the leading manufacturers of glace fruits.—ED.]

The fruits must be just ripe. If they are too ripe they cannot be well prepared, on account of their softness; and if they are green they have a bad appearance. We buy fruit throughout the whole of southern France. We sometimes buy cherries even as far north as Dijon. Cherries, apricots, greengages, figs, pears, and almonds are the fruits principally used.

When the fruit is received our first care is to treat it with sulphur. This is in order to improve its appearance and to destroy any microbes possibly lurking in it. There are two processes employed for this purpose. The one commonly used is to expose the fruits in cases or small baskets in a small room about two metres (6.56ft. high), which is filled with fruit in baskets. We then insert in a jar about two to five kilos (kilo, 2.2lbs.) of sulphur, according to the quantity of the fruit. For a room containing 3 tons to 4 tons we

put five to six kilos of sulphur. If there has been much rain, and fruit consequently is soft, less sulphur must be used, and more in the case of hard fruit. The idea is to secure complete impregnation of the fruit by the sulphur, which also has the effect of bleaching the fruit.

The second method is not often used, and consists of treating the fruit with a solution of 200 grammes (7.05ozs.) of pure sulphurous liquefied acid to 100 kilos of water. The water thus strongly impregnated with the acid is used for bleaching the fruit, which is placed for that purpose in jars, into which the solution is then poured. According to the quality of the fruit we leave it exposed for two to ten hours to the action of the liquid. We leave apricots one to two hours only; but cherries should remain from night to morning. The same results are obtained in the United States with sulphate of lime. The fruit is then placed in clear water for two or three days, the water being frequently changed during that time, after which it is considered sufficiently bleached. We then place it in steam kettles, and boil it for 10 minutes to one hour, according to the hardness of the fruit. It must be brought to such a state that the sugar syrup about to be applied may penetrate readily into it.

After the fruit has been boiled, we begin the sugar process. The fruit is removed from the water and drained for 10 or 20 minutes; then placed in earthenware jars containing certain quantity of sugar syrup. Some manufacturers use sugar at 20° Baume concentration, some at 25°, and others at 28°. This is a question of personal appreciation, and depends also on the condition of the fruit. If the cherries appear soft, we make the syrup more concentrated; if they are hard, we use it at 15° to 20° concentration. The contents of the jars are emptied after a few hours into steam kettles containing sugar syrup. By boiling, part of the syrup evaporates and is replaced by an equal quantity of syrup in order to preserve the percentage of syrup and fruit. The fruit is left in the jars for one day, and is again boiled in the kettles on the second day, then remaining in the jars for two days. After the second operation the fruit remains in the jars three days, and so on for five, six, or eight boiling operations, the intervals between them being longer each time, the fruit sometimes remaining from six to eight days before the final boiling. At each addition of syrup the concentration is made greater. The application of the sugar should not be done hurriedly; otherwise the fruit, instead of absorbing the greatest possible amount of sugar, will shrink and become corded in the interior, thus spoiling its appearance. It is to our interest to apply the largest possible quantity of sugar, as the more syrup the fruit contains the greater our profit.

We boil the fruit at least six or eight times, according to the size, the operations covering a period of at least six weeks, during which time it absorbs the largest possible quantity of syrup. At the final boiling the syrup is concentrated to 35° Baume, and after this operation we regard the fruit as

capable of being kept for a long period. We have known it to remain in good condition for two or three years. However, if kept too long the appearance suffers, though the eating qualities remain unaltered. After the final boiling the fruit is allowed to remain in the highly concentrated syrup, in a cool place not too dry nor too damp, and of even temperature. At this stage the fruit is known to us as "fruit confit."

On receipt of an order from client a sufficient quantity of the fruit is removed from the jars and drained of the syrup. This is done by placing it in willow baskets and allowing the syrup to drain through the openings of the baskets. We now proceed to the operation of glacage, which is the final stage of the preparation of the article for the market.

For this operation the fruit, drained of its syrup, is placed in a solution of pure concentrated sugar, at about 45° Baume concentration. While it is in this solution we change the nature of the liquid by an operation known as the "masse." This consists in rubbing one side only of the inside of the kettle with a piece of wood about 2ft. long by 1½in. thick, as a result of which the syrup at that point becomes chemically changed and turned white. The fruit is then brought into this white liquid, where it remains for a few minutes only. It is then removed and placed on iron grills. The coat of sugar remaining on the fruit dries rapidly in the air. The fruit thus prepared is known as "fruit glace," and can be immediately packed in boxes for the market.

When the fruits are intended for shipment to points beyond the equator it is necessary, in order to render them more durable, to submit them to a further treatment known as "crystallisation." The fruits are taken and placed in a dry oven at 60° centigrade, and at the end of one or two days are placed in receptacles of iron, known to us as "candissoirs," in a hot oven, where they remain for about 12 hours. At the end of that time, under the action of the heat, the sugar syrup forms small crystals on the fruit, and then—when we see that the crystallisation is sufficient—we empty the syrup, and after a few hours the fruits are dry and ready for shipment, being then known as "fruits crystallises."

We use a good quality of crystallised sugar, costing at present about 55 francs to 56 francs per 100 kilos (franc, 19.3 c.), and require 100 kilos of it to make the same quantity of fruit.

PRIZES FOR WHEAT AT THE MARCH SHOW.

By W. L. SUMMERS.

During the past season the question of why farmers do not exhibit wheat at the March show of the Royal Agricultural Society was submitted to the Branches of the Agricultural Bureau. The replies from the Branches indicated that the following were the chief reasons for the paucity of exhibits of our chief agricultural product:—(1) Costs too much in time and money. (2) Prize money is not sufficient to compensate for cost and trouble involved. (3) Conditions as to area from which sample has been taken are too restrictive. (4) Farmers as a body cannot give the time to the special preparation of exhibits which is necessary to win under present conditions. (5) The wheats that win under present conditions are not always profitable wheats to grow. Various modifications were suggested, and these have been submitted to the Agricultural Society.

In the programme now in course of preparation an effort has been made to meet the suggestions of the members of the Branches, and we desire to call the special attention of Bureau members to the chief sections for wheat, and to urge that a special effort should be made to improve the show in these sections by competing therein.

The champion milling wheat, 21bush. to be shown, comes first, the first prize being the Government gold medal (worth £5) and £5 in cash. The prizes for soft and hard wheats have been increased to £4, £2 10s., and £1 10s. respectively for first, second, and third award, the wheat to be 12bush. from the produce of 10 acres. A special class is inserted this year for "three bags representing a bulk of 50 bags of one variety correctly named." The society is offering the liberal prizes of £10, £7, and £3 for this, and offers to pay rail and other charges to the show ground, and their officers will stage the exhibits. It is hoped that farmers will enter freely in this class.

A class which should receive more attention is the special Bureau exhibit of three bags of wheat from the produce of not less than 10 acres, of the one variety. This is for the prizes of £6, £3, and £1 respectively offered by Alick J. Murray, Esq. In order to encourage competition amongst the Branches the Hon. the Minister of Agriculture has approved of the Department defraying the freight on any of these Bureau exhibits, while the Agricultural Society will take charge of the exhibits and stage them. As this will remove the chief objections indicated by Bureau members the Minister hopes that a

number of the Branches will respond. Intending competitors should communicate with the Secretary of the Agricultural Society, as well as with the writer of these notes.

In connection with the Creswell Trophy referred to in the September issue, the Agricultural Society will accept entries up to January 20th, but they must of course be made at least five days before harvesting in order to allow the committee time to appoint someone to represent the society while the plot is being harvested. As the prizes offered are liberal and the conditions intended to encourage the growing of the most profitable varieties a good entry is expected.

Other classes are for new selected or crossbred wheats not more than six varieties in sheaves of not less than 4in. diameter and 2lbs. of grain; collection of six rust-resisting wheats in straw and grain; collection of wheat in the straw; collection of wheat, 1bush. of each; Macaroni wheats; 1bush. of wheat grown in district with average rainfall of not more than 12in. This latter should appeal to members in the outside districts.

Full particulars concerning the conditions and entry fees can be obtained on application to the Secretary Royal Agricultural Society, Adelaide.

TWO BLUE WEEDS.

By W. L. SUMMERS.

As a result of a resolution of the House of Assembly favoring the proclamation as a noxious weed of *Echium plantaginicum*—or Blue Weed, Paterson's Curse, Salvation Jane, as it is variously known—there has been considerable correspondence in the daily papers as to its character. The confusion which so often occurs from the use of local names of plants is evidenced in this connection, some writers appearing to confuse this with another fairly common plant—wild sage. These two plants are, however, very different in

general characteristics, as is shown in the accompanying reproductions from drawings made by Mr. J. M. Black, one of our leading botanical authorities.

Echium plantagineum, L.—This is a strong-growing biennial plant, with large thick lower leaves, and throwing up a flowering stem to a height of 3ft. to 5ft. under favorable conditions. The leaves and stems are thickly covered with stout bristles. The flower, before it expands, is reddish-purple in color, and the lower part remains so when open, but the outer part becomes almost a blue color when expanded. In the North this plant is known as Blue Weed, or Salvation Jane, or Snake Weed; in the South it is generally referred to as Blue Weed. In New South Wales it is known as Paterson's Curse, after a farmer of that name who is reputed to have introduced it into the Albury district as a garden plant.

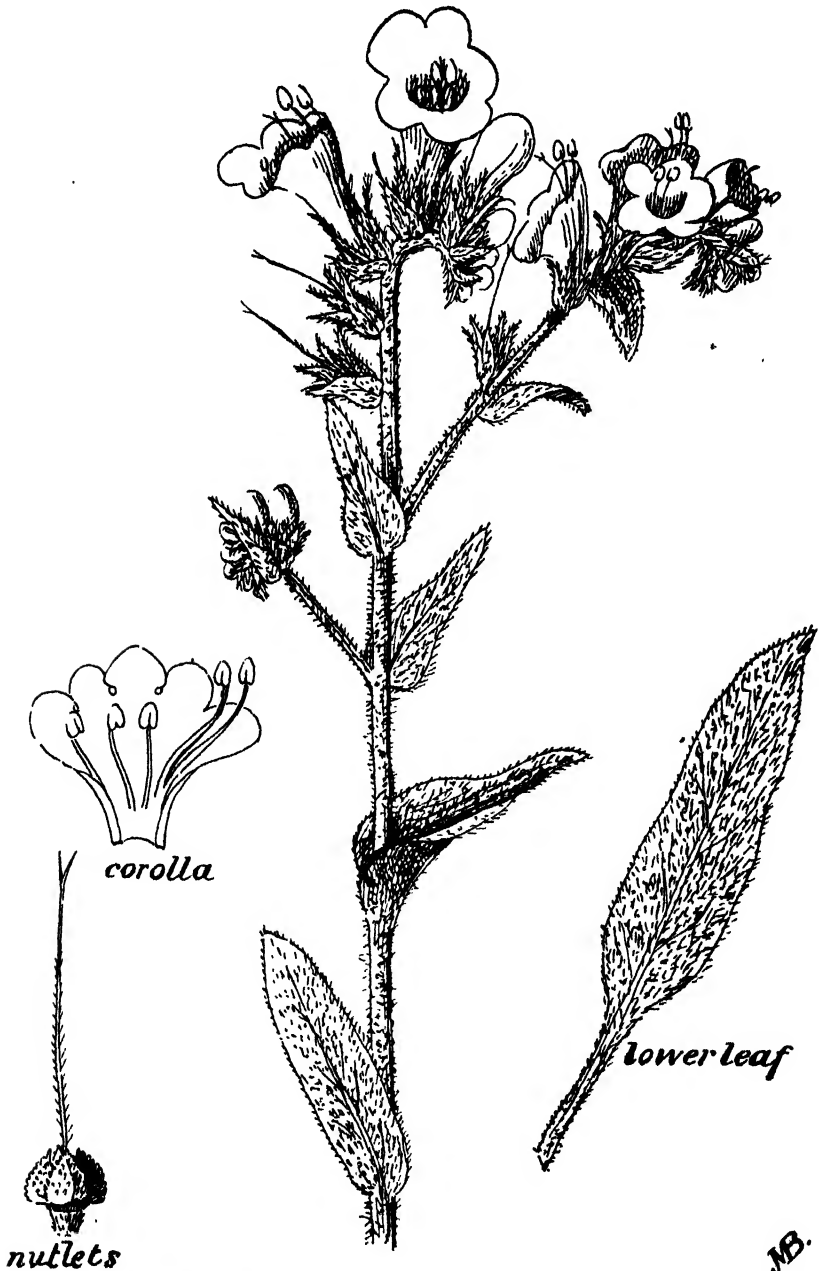
In many parts of the South, Barossa, and the North it has taken possession of hundreds of acres of valuable land, crowding out useful plants. There are very wide differences of opinions amongst landholders as to whether this weed is noxious. In the Southern districts, and about Georgetown, Gulnare, and Laura it is usually condemned as useless and a nuisance because it chokes out more valuable fodder plants. On the other hand, in the districts round Dawson, Johnsburg, Carrieton, and even further north, quite a different view of the plant is held. Here there is a general feeling in favor of the plant as a fodder, both for sheep and cattle. Not only is it eaten when young, but even if cut when in flower cattle are stated to eat it with relish.

A correspondent writing to me from Barossa district mentions that for very many years it has had quite a hold of some portions of his land, but it has in no way reduced its stock-carrying capacity. He mentions one paddock in which the weed was mowed and sheep turned in with the result that they completely destroyed it, which would scarcely be the case unless they relished it. In the face of such strong evidence of value, we have localities equally emphatic in condemnation of the weed, and there is no denying the fact that it has ruined many acres of valuable pasture. The plant is destroyed by cultivation, and close grazing by sheep is said to get rid of it.

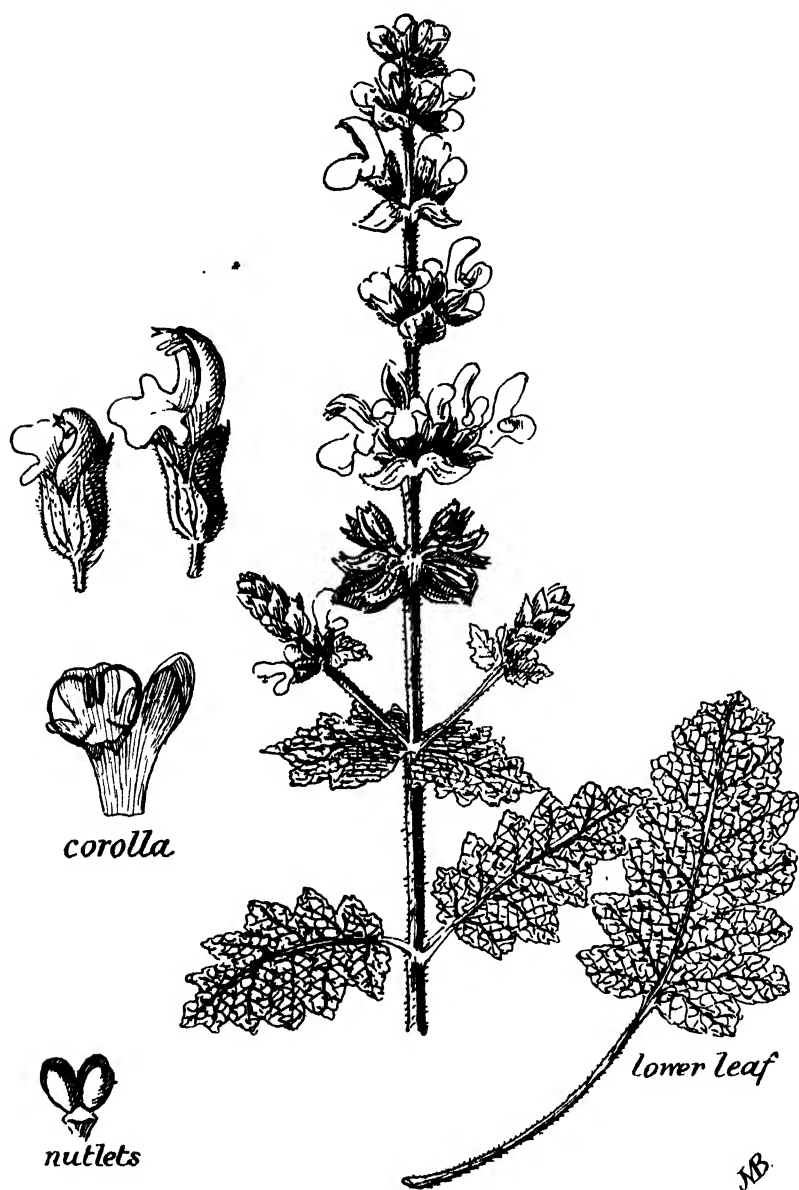
Salvia verbenaca, L.—This is a hardy perennial plant, with pleasantly scented leaves and deep-blue flower. It is usually known as wild sage or salvia. The plant is not so coarse as *Echium*, is devoid of the stiff bristles so characteristic of the latter, and the flowers are smaller. The leaves of wild sage, as shown in the illustrations, are opposite, instead of alternate, and are quite distinct in shape from *Echium*.

With this plant there is also considerable difference of opinion as to its value. Many sheepowners speak favorably of it as a hardy fodder plant which, when they become accustomed to the smell, sheep partake of very readily, while in some quarters it is condemned as noxious. On the whole, however, while probably not a desirable plant to encourage on land capable of producing good pasture, it is of fair value for pasture, and its presence

need occasion no apprehension on the part of landowners. In the Southern districts this wild sage is very widely distributed.



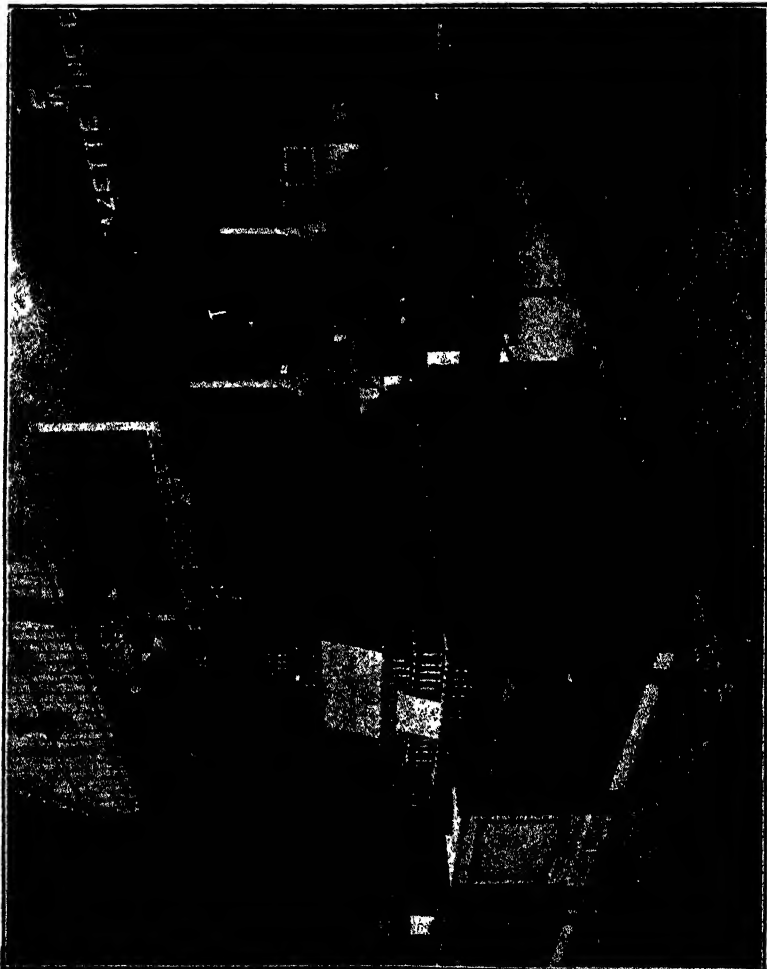
Echium plantagineum, L.—BLUE WEED, OR SALVATION JANE.



Salvia verbenaca, L.—WILD SAGE.

GROCERS' EXHIBITION, LONDON.

A representative exhibit of South Australian produce was shown by the Trade Commissioner, at the Grocers' Exhibition, held in London on September 17th to 24th. The accompanying illustration shows one side of the exhibit, which was favorably commented upon by the Press generally. The exhibit constituted a splendid advertisement for the State. The honey section is a prominent feature of this exhibit, and it may be mentioned that the Trade Commissioner reports a rapidly increasing demand for our honey. Over 40 tons have been cabled for during the past few months.



SOUTH AUSTRALIAN EXHIBIT AT GROCERS' EXHIBITION.

THE INSECTICIDES AND FUNGICIDES ACT.

By W. L. SUMMERS.

South Australia has again set an example to the rest of Australia in the matter of legislation in the interests of the producers. I refer to the passing of an Act to regulate the sale of insecticides and fungicides. Some two years ago the South Australian Fruitgrowers' Association urged the necessity for action in this direction, and this was supported by the Advisory Board of Agriculture, with the result that a Bill for the purpose was introduced this session, and has been passed by both Houses.

In drafting this Bill care was taken, while making effective provision to protect purchasers of fungicides and insecticides, not to place such restrictions on manufacturers as would hamper trade or increase the cost to the buyer. In many respects the principles of the Fertilisers Act have been adopted.

In the Act "fungicide" means any substance used for the purpose of destroying or preventing the attacks of fungi or other parasitic plants or bacteria which shall be declared by proclamation to be a fungicide; and "insecticide" is any substance used for destroying any insects attacking plants, fruits, or animals, or preventing such insects from infesting or attacking such plants, fruit, or animals, or any substance used for destroying rabbits, vermin, or other noxious animals. The provisions of the Act will only apply to such fungicides and insecticides as may be considered advisable, and it is not intended to apply them to everything used as an insecticide or fungicide.

Power is given for the fixing of standards for insecticides or fungicides, and such standards may prescribe a maximum as well as a minimum of any constituents—the constituents that may or shall be contained in any insecticide or fungicide and the chemical or physical conditions of such constituents. When any such standard has been fixed no person is permitted to sell any insecticide or fungicide that is not in accordance with the standard.

Power is also obtained by which sellers may be required to state the percentage of any ingredient in any insecticide or fungicide, and the seller must in such cases give to the purchaser an invoice or statement on which shall be stated—(a) The figure word, trade mark, or trade description branded upon the package; (b) the percentage of such constituents contained in the insecticide or fungicide; and such invoice or statement constitutes a warranty by the seller of the accuracy of all matters contained therein.

Provision is made for the appointment of inspectors, who may enter any place where insecticides or fungicides are kept for sale, and may take samples for analyses. The results of the analyses of such sales may be published in the *Journal of Agriculture* and in such other manner as the Minister of Agriculture may direct.

The necessity for legislation of this character has arisen from the fact that some of our fruit crops are practically dependent upon the purity of the materials sold as insecticides and fungicides, while in other directions also the producer is in a similar position. The very wide discrepancy in the analyses of arsenates of lead published last month shows the necessity for this material being sold under guarantee. It is probable that the adoption of a standard and the publication of results of analyses will result in this material being sold on the actual arsenic contents.



STOOKING HAY AT ROSEWORTHY.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, November 9th, there being present Messrs. J. W. Sandford (chair), C. J. Valentine, Col. Rowell, C. Willcox, R. J. Needham, G. R. Laffer, and J. Miller.

Two years ago the following resolution was carried :—" That the Board would recommend the Government to attach where possible to schools in country districts sufficient land to permit of tree-planting operations being carried out in connection with Arbor Day celebrations wherever the local residents are prepared to assist the school authorities in fencing in land which may be set aside for this purpose." This was now returned by the Director of Education, intimating his approval of the suggestion, which would not be lost sight of. The department was endeavoring where opportunity occurred to secure land for experimental plots and encouraging teachers to form gardens as well as to plant trees on Arbor Day.

The Secretary tabled various resolutions passed at the Annual Congress.

The resolution recommending that the municipal corporations and district councils be asked to periodically test the wheatbuyers' scales was considered. The Secretary stated that this matter was brought before the Minister some eight months previously, and as a result a circular had been sent to the local governing bodies by the Commissioner of Crown Lands, asking them to carry out the provisions of the Weights and Measures Act, the administration of which was entrusted to them. It was resolved that the Minister be asked to again call attention to the necessity for enforcing this Act.

It was resolved that the Board could not recommend the Minister to give effect to Congress resolution in favor of the issue of free passes to delegates to country conferences.

It was resolved that the Board was not prepared to submit any scheme for the training of men on farms and the allocation of agricultural areas for homes for farm laborers as suggested by Congress. Mr. Laffer said no training farm such as suggested was necessary. Any man or youth willing to work and desirous of learning could obtain employment without any difficulty on farms, as there was plenty of opening for such men or boys throughout the State.

Whyte-Yarcowie Branch asked the Board to bring before the Branches throughout the State the necessity for bringing pressure to bear on the district councils to enforce the Noxious Weeds Act. The Secretary thought the Branches might go still further and bring pressure to bear on their councillors

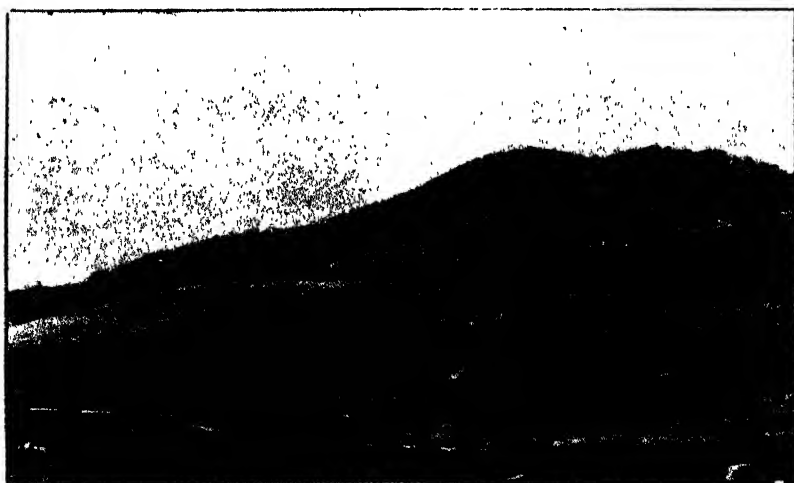
in respect to carrying out other Acts which they had to administer, such as the Rabbit Act, Weights and Measures Act, &c. It was resolved that effect be given to the suggestion.

Mount Remarkable Branch submitted resolution expressing dissatisfaction with the present system of examination of stallions, and asking that the penal clauses preventing rejected horses being submitted for re-examination to another officer should be removed. It was decided to call the Branch's attention to the resolutions carried at Congress in support of the examination of stallions, and to say that the Board is of opinion that the provisions to which objection is taken are necessary to give effect to the intention of the Government.

It was resolved that the Board consider it unadvisable to take any action in respect to resolution of the Hills Conference, asking for the imposition of an import duty on wattle bark. Members pointed out that the object of the proposed duty was to keep out wattle bark from South Africa, but in view of the fact that we did a fairly large trade with that country in fruits, flour, and other produce South Australia had more to lose than to gain by any action which would hinder trade between the two countries.

The following gentlemen were approved as members of the undermentioned Branches :—Mitchell, Messrs. T. Bishop, C. Head, and W. Sampson, sen. ; Balaklava, Mr. J. Diprose.

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IRRIGATION OF LUCERNE.

(Continued from page 244 of October issue.)

The lucerne grown in the Yakima Valley in Washington is practically all irrigated by means of furrows. The grading is usually done by buck scrapers (Fig. 16), while a long, rectangular drag similar to the one shown in Fig. 11 (p. 244) removes most of the surface inequalities that remain after the surface has been levelled roughly by the scraper. The float is made of two 2in. by 6in. timbers about 20ft. long, held in position by crosspieces of the same size 6ft. long.

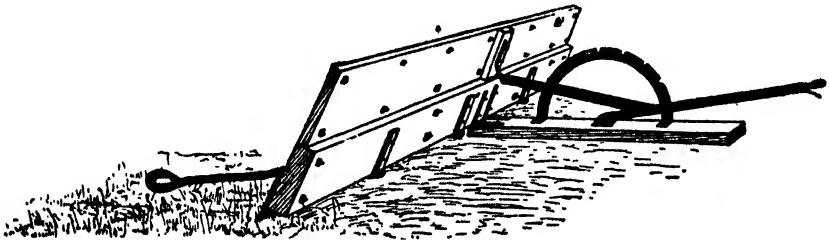


FIG. 16.—BUCK SCRAPER.

The common practice is to run the furrows across the entire width or length of a field, and in consequence their length varies from 20 rods or less in small fields to 80 rods in large fields. As a rule the furrows are too long. Farmers object to cutting up a field by head ditches, but in a climate like that of the Yakima Valley in midsummer by far the most essential element in plant production is water, and all other considerations should give place to it. It has been shown that water is rarely distributed evenly in furrow irrigation, and that much is lost by deep percolation. To increase the length of a furrow beyond 660ft., or one-eighth mile, not only increases the loss but renders a uniform distribution more difficult to secure. Except in rare cases this distance should be regarded as the limit for the length of furrows. In light, sandy soils, having a porous gravel stratum beneath, the length may well be reduced to 250ft.

Fig. 17 shows the manner of dividing a lucerne field for furrow irrigation at Kennewick, Wash. Lumber head flumes, either 8in. by 8in. or 6in. by 6in., are placed along the upper boundary of each strip, and the direction of the flow in both flumes and furrows is indicated by arrows. Auger holes are bored through one side of the flume flush with the bottom at points where water is to be delivered to the heads of furrows. A short

piece of lath revolving on a nail controls the flow from each opening. On steep grades a cleat on the bottom of the inside of the flume nailed on crosswise just below each opening will dam back the water and increase the discharge.

When flumes are considered too costly the water is distributed among the furrows through wooden spouts set in the bank of an ordinary earthen

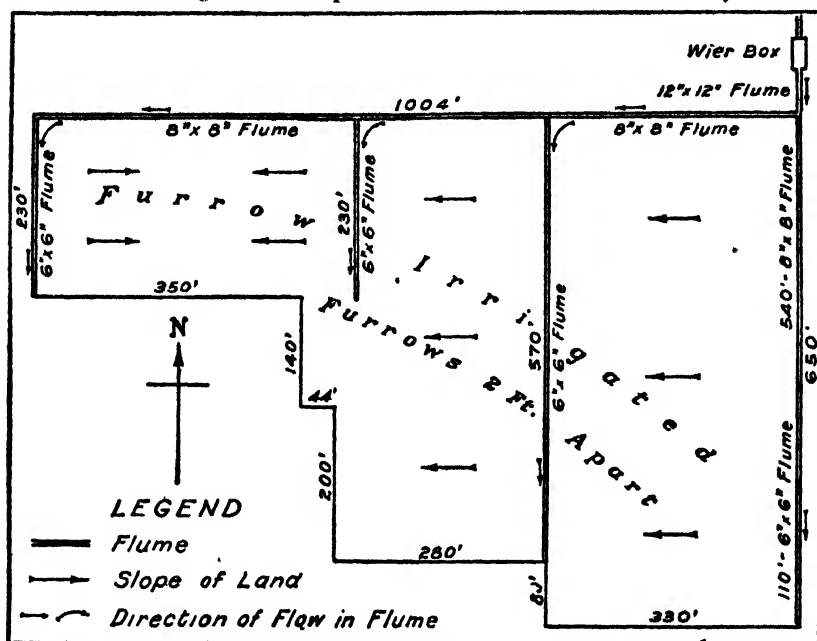


FIG. 17.—SHOWING TRACT PREPARED FOR FURROW IRRIGATION.

ditch (Fig. 18). These head ditches when in operation are divided into a series of level spaces by means of drop boxes which hold the surface of the water at the desired elevation. The spacing of these drop boxes depends on the grade of the head ditch, and their cost averages about 10s. each. Spouts are made usually by nailing together four laths. There is a special lath on the market somewhat heavier than the ordinary one used for plastering buildings, being $\frac{1}{2}$ in. thick, 2 in. wide, and 3 ft. long. Four of these when nailed together cost about 1 $\frac{1}{4}$ d., and each spout in place costs about 3d. Assuming that they are spaced 4 ft. apart, the spouts for a square tract of 10 acres would cost £2 3s., or slightly more than 4s. per acre. The cost of an ordinary head ditch, with four drops or check boxes, would be about £3 for the same tract, or 10s. per acre for both, exclusive of grading, smoothing, and levelling. Tin tubes, $\frac{1}{2}$ in. in diameter, one to each furrow, have sometimes been used instead of the wooden tubes. When set $\frac{1}{2}$ in. below the water surface each tube discharges about 0.1 miner's inch, which is about right for

a slope of 3 per cent. The length of the tin tubes is governed by the size of the ditch bank. The tubes are set while the water is in the ditch and are kept at the same level between check boxes. The cost of tin tubes 2ft. long is about 12s. 6d. per hundred. In many places neither flumes nor tubes

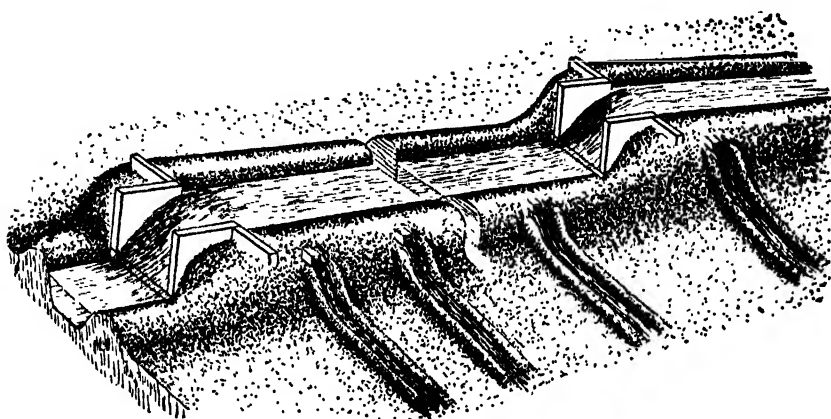


FIG. 18.—MANNER OF PLACING TUBES IN DITCH BANK FOR FURROW IRRIGATION.

are used. Water is taken through cuts in the ditch bank and divided among the furrows as evenly as possible by directing it with the shovel. This practice reduces the cost of preparing the land for irrigation, but it increases the cost of applying water, and does not secure an even distribution among the furrows.

Furrows in lucerne fields are most commonly made by the use of a marker, or furrowing sled (Fig. 19). Sleds with more than two runners are sometimes used, reducing the time required for furrowing, but not producing quite so satisfactory furrows, since an obstruction under one of the outside runners will lift all but the other outside runner out of the ground and leave obstructions in the furrows, which, if not removed, will cause the flooding

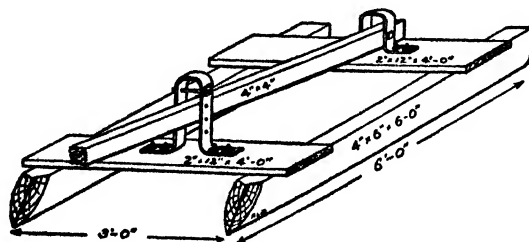


FIG. 19 —FURROWER USED ON EXPERIMENT FARM RIVERTON WYC.

of the surface. Sometimes a marker is put on the sled to indicate the place for the next furrow.

For the irrigation of most of the crops grown in the vicinity of Twin Falls, Idaho, the feed ditches are laid out across the field as nearly parallel as possible on a grade of 2in. to 6in. to 100ft. and 300ft. to 500ft. apart. Furrows are made in the direction of the greatest slope and approximately at right angles to the feed ditches. Starting at the upper end, a wooden check is inserted in the ditch at the end of each fall of 12in. Thus, if the ditch has a fall of 4in. to 100ft. the checks are placed 300ft. apart. Each check box is provided with a removable flashboard, which, when in place, backs the water to the next check above, and at the same time permits the surplus water to flow

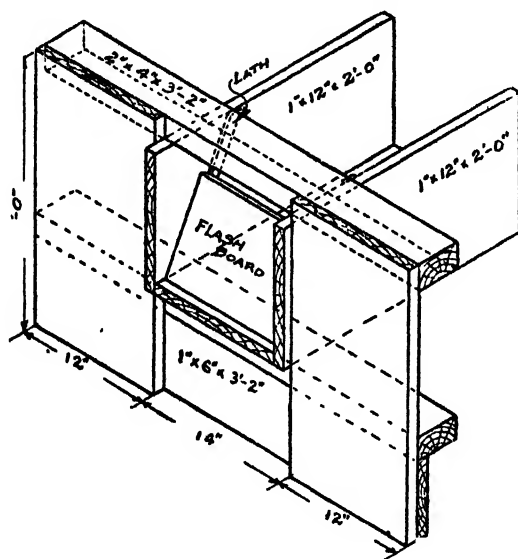


FIG. 20.—CHECK BOX FOR FURROW IRRIGATION.

over its top to supply the checks below (Fig. 20). Lath tubes 16in. to 24in. long are inserted in the lower ditch bank about 3in. below the water level formed by the flashboards when in place. These tubes are put in while the check is full of water in order that all of each set may be on the same level and that water may be had for puddling. The flow from each tube may be divided among several furrows. Ordinarily a 40-acre farm will require about 30 check boxes and 1,800 tubes. Nearly one-half the tubes ought to be 24in. long to insert near the check boxes where the bank is heaviest, while the remainder may be 16in. long. The check box shown in the sketch (Fig. 20) calls for 17 sup. ft. of lumber, but a serviceable box can be made out of old packing boxes.

Some of the advantages of this method over ordinary furrow irrigation are: A constant head over the inlets of each set of tubes, while the surplus passes down the field ditch; the opportunity to use one or all or any combination of checks at the same time, as it is possible to regulate the head, and consequently the discharge by raising or lowering the flashboard; and the automatic character of the water distribution while irrigating.

No fixed rule can be given as to the proper spacing of the furrows or the time water should run in each. In heavy retentive soils the furrows may be 2in. to 2½in. deep and only 16in. apart, while in more open soils the furrows may be 48in. apart.

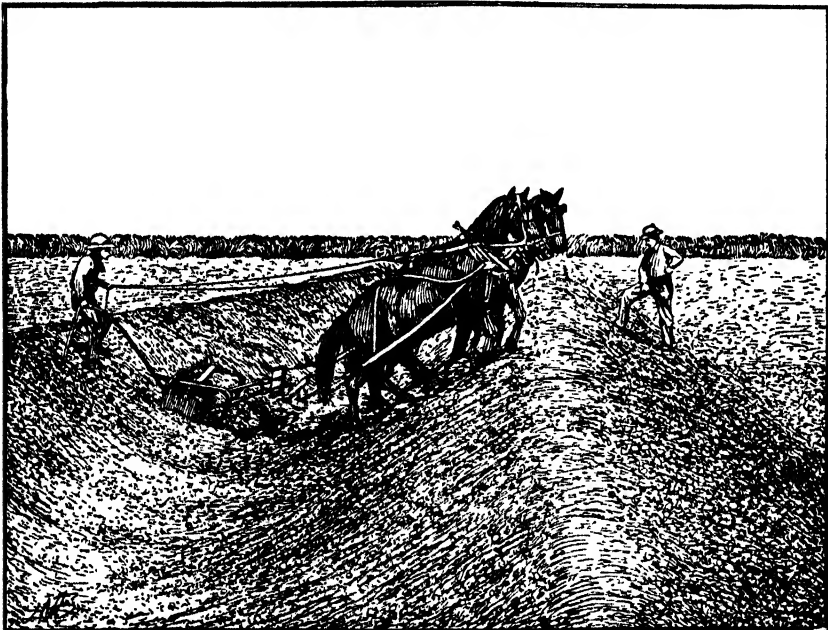


FIG. 21.—BUILDING A SUPPLY DITCH.

The amount of water which should flow in each furrow depends on the character of the soil and the slope. It is a common practice in the Yakima Valley to space the furrows 18in. to 24in. apart when the seeding is done, but as the plants grow their roots soon penetrate several feet into the soil, and alternate furrows are then abandoned. If the tract contains 10, 20, or 30 acres the furrows run all the way across if the slope will allow it. Water is frequently run a quarter of a mile in the small furrows. In furrows 660ft. to 1,320ft. long in sandy loam the water has to be kept running continuously for about two days, and consequently there is usually much waste due to deep percolation. In distributing water in furrows it is a good plan to follow

the practice of the irrigators of the orange belt in southern California, who turn into each furrow, until the furrows are wet, three or four times as much water as will be permitted to remain, and then reduce the flow.

FARM DITCHES.

The capacity and, to some extent, the location of farm ditches depend chiefly on the method of applying water. In the border method the supply ditch is usually large and so located as to convey a sufficient volume of water

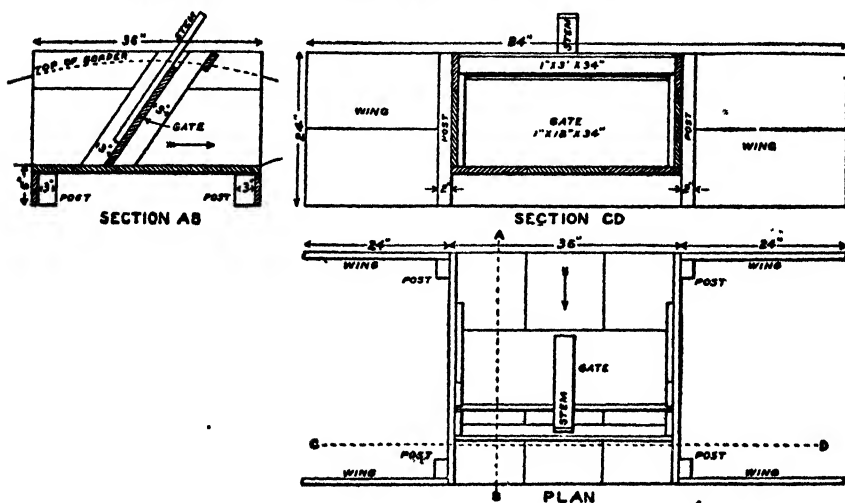


FIG. 22.—A BORDER GATE USED IN IMPERIAL VALLEY.

to the head of each land. In Imperial Valley in California these head ditches, as they are called, have a bottom width of 6ft. and a surface width of 12ft. to 14ft. In building a ditch of this size a strip 6ft. wide on the centre line of the ditch is ploughed 6in. deep. Then parallel strips, also 6ft. wide, are ploughed 8ft. distant from it. Scraper teams then cross and recross these, taking dirt from the ploughed strips and dumping it on the unploughed spaces to form the banks (Fig. 21). The banks when completed are about 2ft. above the natural surface of the ground, and the bottom of the ditch is 6in. to 10in. below it. When it is deemed best not to create a depression at the outer toe of each embankment, the borrowed dirt is taken from the high parts of the adjacent land.

The water required for each land is withdrawn from the head ditch through a border gate. These are usually made of wood. Fig. 22 shows the type of border gate used by F. N. Chaplin, of Holtville, in Imperial Valley. It requires 49 sup. ft. of redwood, which, at £8 8s. per thousand, makes the

lumber cost 8s. 3d. The hardware, carpentry, and setting increase the cost to about 13s. If it is assumed that 22 gates are needed for a 40-acre

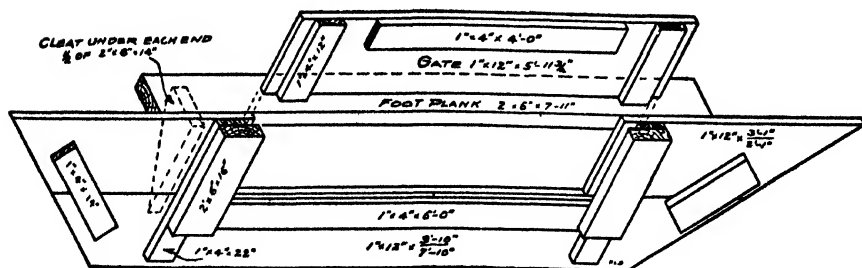


FIG. 23.—BORDER GATE USED NEAR SUNSET CITY, CAL.

tract the cost per acre for the border gates is 7s. 2d. A cheaper border gate is shown in Fig. 23, which represents the kind used on a lucerne tract at Sunset City, Cal. In some localities concrete is being substituted for wood

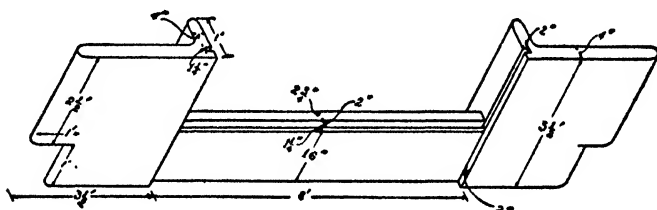


FIG. 24.—CONCRETE GATE USED IN YOLO COUNTY, CAL.

and Fig. 24 shows a border gate of this material, quite generally used for the irrigation of lucerne in Yolo County, Cal.



FIG. 25.—SUPPLY DITCH WITH BOTTOM WIDTH OF 4 FT.

In the check method of irrigation the volumes used do not differ materially from those required to flood the lands in the border method, and the feed ditch for the checks corresponds in size and capacity to that of the head ditch for borders. Cross sections of common forms of supply ditches are shown in Figs. 25 and 26. The carrying capacities of these ditches under different grades are given in the accompanying table.

Mean Velocity and Discharge of Ditches with Different Grades.

SUPPLY DITCH, FIG. 25.

GRADE.			Mean Velocity in Feet per Second.	DISCHARGE.	
Inches per Rod.	Feet per 100ft.	Feet per Mile.		Cubic Feet per Second.	Miner's Inches Under 6in. Pressure Head.
$\frac{1}{8}$	0.03	1.58	0.84	4.20	168
$\frac{1}{8}$	.06	3.33	1.08	5.40	216
$\frac{1}{8}$	.13	6.67	1.54	7.70	308
$\frac{1}{8}$	.19	10.00	1.89	9.50	378
$\frac{1}{8}$	.25	13.33	2.20	11.00	440
$\frac{1}{8}$	.31	16.67	2.45	12.20	490
$\frac{1}{8}$	.38	20.00	2.69	13.40	538

SUPPLY DITCH, FIG. 26.

$\frac{1}{8}$	0.03	1.67	1.03	11.60	464
$\frac{1}{8}$	.06	3.33	1.48	16.70	666
$\frac{1}{8}$	.09	5.00	1.82	20.50	819
$\frac{1}{8}$	.13	6.67	2.11	23.70	950
$\frac{1}{8}$	.16	8.33	2.35	26.40	1,058
$\frac{1}{8}$	.19	10.00	2.58	28.00	1,121
$\frac{1}{8}$	.22	11.67	2.80	30.50	1,260

In flooding land from field laterals two kinds of channels are needed. The larger ones convey the water to the highest corners of the fields and along



FIG. 26.—SUPPLY DITCH WITH BOTTOM WIDTH OF 6FT.

one or two borders of each field; the smaller distribute the water over the field. In this method of applying water smaller streams are used than in

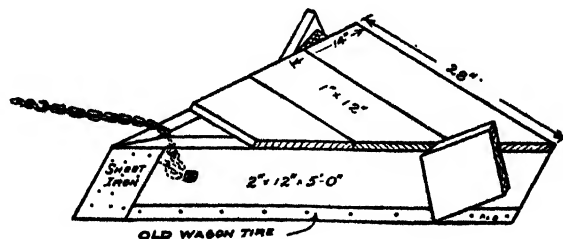


FIG. 27.—"A" CROWDER.

either the check or border method. Except on large farms the stream seldom exceeds 3 cub. ft. per second, and is usually between 2 cub. ft. and 3 cub. ft. On ordinary grades only a small channel is needed for this volume. Such

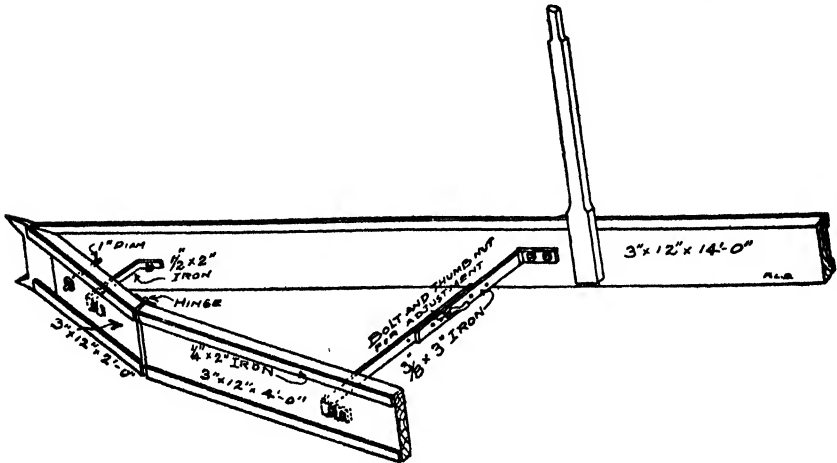


FIG. 28.—ADJUSTABLE "A" SCRAPER OR CROWDER.

channels are made by ploughing first a strip as wide as the surface of the ditch is to be when full and removing the loose dirt by one of several designs



FIG. 29.—LATERAL DITCH WITH BOTTOM WIDTH OF 14IN.

of A crowders, two of which are shown in Figs. 27 and 28. One of the best implements for making field laterals is a 14in. or 16in. lister plough on a



FIG. 30.—LATERAL DITCH WITH BOTTOM WIDTH OF 16IN.

sulky frame. Figs. 29 and 30 show cross sections of lateral ditches made in this way, while Fig. 31 represents a common type of supply ditch. The



FIG. 31.—LATERAL DITCH WITH BOTTOM WIDTH OF 2FT.

effect which grade has upon such channels is shown in the accompanying table, giving discharges of these ditches, with various grades.

Table Giving the Mean Velocity and Discharge of Ditches with Different Grades.

LATERAL DITCH, FIG. 29.

GRADE.			Mean Velocity in Feet per Second.	DISCHARGE.	
Inches per Rod.	Feet per 100ft.	Feet per Mile.		Cubic Feet per Second.	Miner's Inches Under 6th. Pressure Head.
$\frac{1}{4}$	0.25	13.33	1.01	0.67	27
$\frac{3}{4}$	.38	20.00	1.23	.81	32
1	.51	26.67	1.42	.93	37
$1\frac{1}{4}$	.63	33.33	1.50	1.05	42
$1\frac{1}{2}$	.76	40.00	1.75	1.16	46
2	1.01	53.33	2.04	1.35	54
$2\frac{1}{2}$	1.26	66.67	2.28	1.50	60
3	1.51	80.00	2.50	1.64	61
$3\frac{1}{2}$	1.77	93.33	2.70	1.78	71

LATERAL DITCH, FIG. 30.

$\frac{1}{4}$	0.13	6.67	0.82	0.80	30
$\frac{3}{4}$	.25	13.33	1.16	1.00	42
$\frac{3}{2}$	.38	20.00	1.42	1.30	52
1	.51	26.67	1.64	1.50	60
$1\frac{1}{4}$	.63	33.33	1.84	1.70	67
$1\frac{1}{2}$	.76	40.00	2.02	1.80	74
$1\frac{3}{4}$	.88	46.67	2.18	2.00	80
2	1.01	53.33	2.34	2.10	86
$2\frac{1}{2}$	1.26	66.67	2.61	2.40	96

LATERAL DITCH, FIG. 31.

$\frac{1}{4}$	0.06	3.33	0.79	2.08	83
$\frac{1}{2}$	.13	6.67	1.13	3.00	119
$\frac{3}{4}$	.25	13.33	1.60	4.20	168
$\frac{3}{2}$	.38	20.00	1.97	5.20	207
1	.51	26.67	2.28	6.00	239
$1\frac{1}{4}$	.63	33.33	2.57	6.80	270

THE SUB-IRRIGATION OF LUCERNE FIELDS.

As a general thing lucerne is irrigated from the surface downward by one of the methods previously described. There is, however, a small percentage of lucerne lands, probably not more than 5 per cent. of the total, which is irrigated from below. Frequently the seepage water from porous,

earthen ditches and the waste water from irrigated areas pass through the subsoil of lower fields sufficiently near the surface to sub-irrigate them. In other places these seepage waters collect at the lower levels and raise the ground water near enough the surface to supply the plants with the needed moisture. It is questionable if lucerne-growers should place much dependence on this mode of supplying moisture to the plant. What is gained in not having to irrigate is usually more than lost in damage done to both soil and crop by the rise of the ground water. Wherever alkali is prevalent the rise of the ground water near the surface is almost certain to be followed by an accumulation of alkali on the surface. Again, the fact that lucerne fields sub-irrigate is usually nature's way of giving warning that the ground water is rising dangerously near the surface, and observations should be made to determine if the level is above the danger limit. One of the best ways of making such determinations is by means of bored test wells. These are made by boring holes from 2in. to 4in. in diameter in different parts of the field and noting at regular intervals the elevation of the ground water in each. Where the subsoil is a clay or a clay loam no lining will be necessary other than a joint of drain tile or a short wooden tube. Where the subsoil is loose it may be necessary to line the wells with thin galvanized iron or with a wooden box. The wells may be connected by a line of levels, the elevations being taken on the tops of stakes driven beside the wells. These well records if taken at weekly or even monthly intervals for several years will show at a glance not only the position of the ground water, but also its rise and fall throughout the seasons. Whenever it is found that the water table stands for any considerable time at less than 4ft. from the surface there is cause for alarm, and measures should be taken to prevent such an accumulation of seepage waters or to remove the surplus by drainage.

Lucerne is sub-irrigated also from the beds of streams. On bottoms the danger is not so great, because there is less alkali present and the height of the ground water is governed by the condition of the stream. It happens often that when the water table is at its highest point the lucerne plants are dormant or nearly so, and as a result are not so readily injured. Two cases of successful sub-irrigation from stream channels are here cited by way of illustration.

On the farm of J. A. King, located on the second bottoms about five miles north-east of Boulder, Colo., the water table is 10ft. to 12ft. below the surface. An average yield of lucerne of four tons per acre has been obtained for the past nine consecutive seasons from this farm without any perceptible deterioration. The crop was irrigated the first year, but after that the roots had evidently reached water and continued to draw their supply from that source.

On the Arkansas River south of Cimarron, Kans., John Bull has a lucerne field of over 50 acres which is sub-irrigated. The water table is found at a depth of 6ft. to 8ft., and the yield is usually 1 ton at each cutting. It is

cut three to five times each season, and in some years one crop of seed and two crops of hay are raised.

Throughout the arid region there are a few localities where sub-irrigation is quite generally practised. Perhaps the most notable of these is to be found in the vicinity of the towns of St. Anthony and Sugar City, in the upper Snake River Valley in Idaho. This sub-irrigated district comprises an area of about 60,000 acres. A characteristic of the subsoil of this large area is that it is composed of sand and gravel, sometimes mixed with cobble

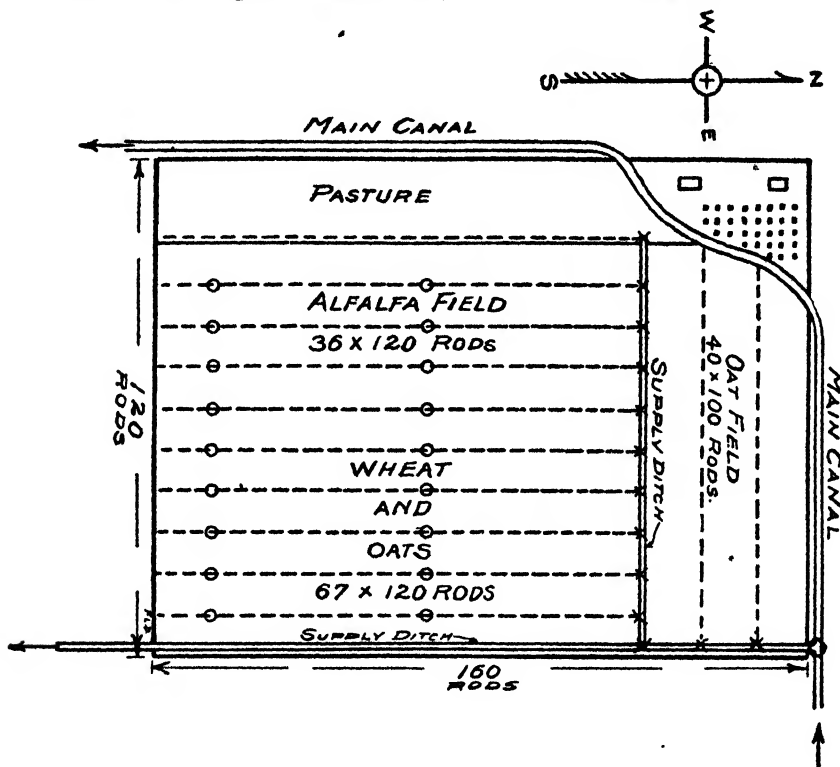


FIG. 32.—ONE HUNDRED AND TWENTY-ACRE SUB-IRRIGATED FARM OF C. H. DECAMP, 12 MILES SOUTH OF ST. ANTHONY, IDAHO.

rock to the lava bed rock, which is found at depths varying from a few feet to 90ft. The surface soil around St. Anthony is a dark-colored gravelly loam 2ft. to 4ft. deep. On the Egin Bench it is a dark sandy loam $1\frac{1}{2}$ ft. to 5ft. deep, while around Sugar City it is a clay loam 4ft. to 6ft. deep. The land slopes to the south and west at the rate of about 10ft. to the mile.

At first ordinary ditches were built, and for years attempts were made to irrigate the land by the usual methods. These failed, however, since all the water turned into the ditches soon sank into the porous subsoil beneath.

In time much of this subsoil filled up with water, due to an impervious lava bed rock, and the top layers of soil became moistened from below. This condition led the farmers to adopt a new method of irrigation, a type of which is shown in Fig. 32. On a farm of 120 acres, the property of C. H. DeCamp, located 12 miles south of St. Anthony, Idaho, the main canal passes along the north and west boundaries. From this a supply ditch is run which feeds the smaller laterals. These laterals are shallow ditches about 3ft. wide and 6in. deep, and divide the farm into strips. On the majority of farms the laterals do not exceed 1,320ft. in length and are spaced 100ft. to 300ft. apart. On this particular farm their length is increased beyond the average and their width decreased. In this mode of irrigation no water is spread over the surface; the laterals merely distribute 15 to 20 miners' inches each to different parts of the field, where it soon joins the ground water by sinking through the bottoms of the shallow ditches. The land is planted in the early spring when the ground water is low, and then water is turned into the ditches and kept in day and night until the ground water rises sufficiently near the surface to supply the needed moisture to the roots of plants. Thereafter the height of the ground water is regulated by the amount of water turned into the supply ditch. The rise and fall of the ground water is determined by means of small boxes set in the ground 3ft. to 5ft. deep, as indicated by the circles in Fig. 32. Twenty to 30 boxes are usually required for each 80-acre farm. All water is turned out of the main canal prior to September 15th to permit the land to dry out for the harvesting of such crops as sugar beets, potatoes, &c. When the crops are removed a small stream is left running in the main canal all winter; but notwithstanding this supply the ground water usually falls from 6ft. to 20ft. below the surface during the autumn and winter months. This somewhat novel method of applying water has led to the adoption of a rotation of crops which seems to suit both water and soil conditions. Lucerne does not do well after the third year. This is chiefly due to the height at which the ground water is kept during the spring and summer months. Then, too, the soil is lacking in humus. These conditions have led the farmers to grow lucerne on a tract for two or three years and then to turn the lucerne under and raise grain, sugar beets, and potatoes for the next three years. Under this rotation the yields per acre on well-managed farms are 40bush. to 60bu h. of wheat, 75bush. to 110bush. of oats, 50bush. to 90bush. of barley, 300bush. to 500bush. of potatoes, 15 tons to 20 tons of beets, and 4 tons to 6 tons of lucerne. The land sells for £20 to £30 an acre.

AMOUNT OF WATER REQUIRED.

Lucerne requires more water than most crops. This is readily accounted for by the character of the plant, the rapidity with which it grows, the number of crops produced in one season, and the heavy tonnage obtained.

As a result of careless practice there is a lack of uniformity in the quantity of water used, the volumes applied frequently being far in excess of the needs of the crop. The majority of the records collected and published by this office show a yearly duty of water for lucerne ranging from 2½ ft. to 4 ft. in depth over the surface, while in quite a large number of cases the volumes applied would have covered the area irrigated to depths of 6 ft. to 15 ft.

From the large number of measurements made on the duty of water it is possible to select some that possess great value, since they indicate what can be accomplished with a given quantity of water.

During the season of 1904 careful measurements were made by C. E. Tait, of this office, of the amount of water used on lucerne fields in the vicinity of Pomona, Cal. The rainfall at Pomona for the winter of 1903-4 was much below the normal and amounted to about 9.1 in. The quantity of irrigation water applied by pumping averaged 2 ft. 4 in. in depth, and the yield of cured hay averaged from 1 ton to 1½ tons per acre per crop, five or six crops being common. These figures are corroborated by many others collected in southern California. Perhaps in no other locality of the arid region is a greater tonnage of lucerne obtained, yet in a climate of scanty rainfall having a long, dry, hot summer only a comparatively small amount of water is used. About a third of the 9,000 acres irrigated by the Riverside Water Company is in lucerne, and for the past seven years the average depth applied has been 2 ft. 4 in., while the depth of rainfall and irrigation water combined has averaged 3 ft. 2 in.

In 1903 the writer, when director of the Montana Experiment Station, applied different depths of water to seven plats of lucerne, with the results given in the following table. It will be seen that a high tonnage for so short a season as prevails in Montana was obtained from plat 5 with the use of 2 ft. of water. By irrigating plat 6 seven times and plat 7 eight times it was possible to increase the yield to the amounts stated. The results of this experiment seem to confirm the best practice of southern California, which may be summed up by stating that in localities having an annual rainfall of about 12 in. remarkably heavy yields of lucerne may be obtained from the use of 24 in. to 30 in. of irrigation water, providing it is properly applied.

Quantities of Water Applied to Lucerne and Yields Secured, Montana Experiment Station.

Plat Number.	Depth of Irrigation.	Depth of Rainfall.	Total Depth.	Yield per Acre of Cured Lucerne.
	Feet.	Feet.	Feet.	Tons.
1	0.5	0.70	1.20	4.61
2	None	.70	.70	1.95
3	1.0	.70	1.70	4.42
4	1.5	.70	2.20	3.75
5	2.0	.70	2.70	6.35
6	2.5	.70	3.20	7.20
7	3.0	.70	3.70	7.68

THE PROPER TIME TO IRRIGATE LUCERNE.

The general appearance, and more particularly the color of the plant, are the best guides, perhaps, as to when water is needed. When healthy and vigorous, lucerne is of a light-green color; but when the supply of moisture is insufficient the leaves take on a darker and duller shade of green and begin to droop, and unless water is provided both stems and leaves wither and die. Another test is to remove a handful of soil 6 in. or so beneath the surface and compress it in the hand. If it retains its ball-like shape after the pressure has been removed and shows the imprints of the fingers the soil is sufficiently moist, but if it falls apart readily it is too dry. In connection with such tests it is well to bear in mind that they are more or less influenced by both soil and climate. It is therefore necessary to observe the growth of the plant closely on all new lucerne fields to determine if possible how far such tests may be relied upon, the chief object being to maintain at all times as nearly as practicable the proper amount of moisture in the soil surrounding the roots of the plants to prevent a checking of their growth.

Lucerne commonly receives careless treatment at the hands of western irrigators. When water is available and is not needed for other crops it is usually turned on the lucerne fields or meadows whether these need it or not. There is no question that yields of lucerne might be considerably increased if more care was used in finding out when to apply water. In each kind of soil and under any given set of climatic conditions there is a certain percentage of soil moisture which will give the best results. Under the present unskilful practice it is impossible to maintain uniform soil moisture conditions for any length of time. The soil is apt to receive too much or too little water, or else it is deluged with cold water at a time when it needs only heat and air. The number of irrigations required depends upon the depth and nature of the soil, the depth to ground water, the number of cuttings, and the rainfall, temperature, and wind movement. Other things being equal, more frequent waterings are required in the warm sections of the south than in the cooler portions of the north. The number of irrigations per year for lucerne ranges from four in Montana and Wyoming to as many as 12 in parts of California and Arizona. In localities where water is scarce during part of the season the number of waterings as well as the amount used each time depends on the available supply. It is a common practice to apply frequent and heavy irrigations in spring when water is abundant, and to water less often and more sparingly when the supply is low.

WINTER IRRIGATION OF LUCERNE.

When water is applied either to bare soil or to crops outside of the regular irrigation season it is termed winter irrigation. The practice thus far has been confined largely to the warmer parts of the arid region. It has become

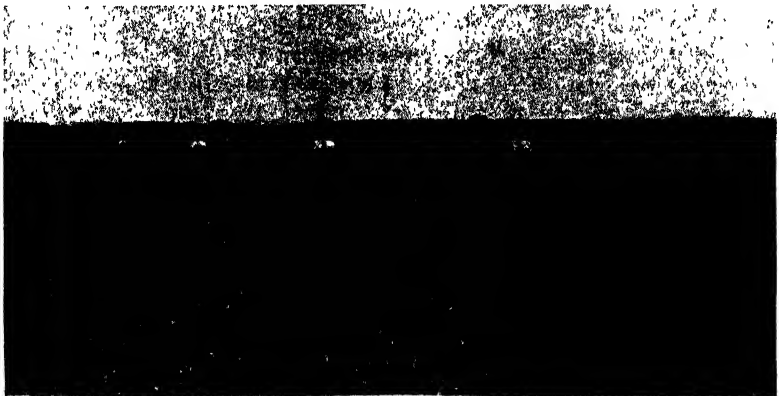
well established in Arizona and California and is being quite rapidly extended to parts of Oregon, Kansas, and the Rocky Mountain States.

Experience has shown that a deep retentive soil is capable of storing a large quantity of water. On account of the fluctuation of western streams of all kinds, from the small creek to the large river, the greatest flow of water often comes at a season when there is least demand for it. In a few localities adequate storage facilities have been provided to retain the surplus, but as a rule it is allowed to go to waste. The passage of so much waste water led to the introduction of winter irrigation, and in nearly every case the results have been satisfactory. The chief differences between winter and ordinary irrigations are the larger volumes used, the crude manner of conveying and applying the water, and the dormant or partially dormant condition of the plants at the time of irrigation.

In Fresno County, Cal., water is turned into the canals in January and February. The large canals of the Modesto and Turlock districts run more than half a head during the latter half of February. This is the rainy period in both these localities, and the soil is usually too wet for plant growth, but water is applied to lucerne fields to fill up the subsoil so as to provide a surplus for the rainless summer when water is scarce.

Besides furnishing a supply of much-needed moisture, winter irrigation, when conditions are favorable, prevents winter-killing and improves the mechanical condition of the soil.

(To be continued.)



REAPING ON A LARGE FARM.

THE WHEAT MARKET.

There was but little change in the conditions of the local wheat market during the month of November. For a week or more at the beginning of the month the price remained at 3s. 6d., but from then onwards there was a gradual improvement, until, on the 24th, as much as 3s. 9d. to 3s. 9½d. was offered for old season's and new season's wheat, the rise being attributed to unfavorable news from the Argentine. Since then, however, values have again dropped 2d. per bushel, so that the price at the end of the month was practically the same as it was at the beginning. All the Australian markets are dependent on advices from London, and it is interesting in this connection to study the attached table of London, Adelaide, Melbourne and Sydney quotations. It will be noticed that Adelaide and Sydney quotations have been practically the same throughout the month, Melbourne being generally 1d. per bushel better. The trade papers to hand do not suggest any likelihood of a shortage in the home markets during the next few months. According to *Beerbohm's Evening Corn Trade List* the weekly shipments to Europe between August 5th and October 20th totalled no less than 19,100,000 quarters, the largest total on record for that season, being nearly 3,000,000 quarters in excess of the shipments for the same period in the previous year. A week previously the same paper said, "Latest reports from both the Argentine and India describe crop prospects as very favorable, and in both countries there has been a fair increase in the area sown. Some time, however, must elapse before these crops can be considered as in any way safe, especially in the Argentine, where the crop is liable to damage by frost and locusts. The progress of the crops in these two countries will be followed with great interest, as the course of prices in the future will probably depend very much on the amount of Argentine and Australian wheat available in the first few months of 1911."

The following letter respecting Australian freight rates, addressed by Messrs. Raeburn & Verel, of 45, West Nile Street, Glasgow, to the editor of the *Shipping Gazette* on October 12th, affects shippers probably more than growers :- "Sir.--We think that owners who have steamers coming on for grain home from Australia should know the additional expense they have to face in connection with the loading. One of our steamers, which has just loaded at Sydney, has incurred an exceedingly heavy bill for dunnage, and the captain writes that the surveyors are now demanding shifting boards in the 'tween decks, and 4ft. downwards from underneath 'tween decks. The reason they have given for this requirement is that a Clan Line steamer with a full grain cargo from Australia capsized two years ago--a most extraordinary reason! Three of our steamers loaded a full cargo of grain in bags in Australia last season, and there was no such demand made then. Owners must now, however, reckon with this further expense, which will mean about 6d. per ton off the freight. We hope, therefore, that all owners who are thinking of fixing their steamers homeward from Australia for bagged grain this season will put this charge on to the rate of freight. Of course there is not only the expense of fitting the shifting boards to be taken into account, but every ton of wood means a ton less cargo carried. We have not taken this into account in the 6d."

Date.	LONDON (Previous Day).		ADELAIDE.		MELBOURNE.		SYDNEY.	
	Per Bushel.		Per Bushel.		Per Bushel.		Per Bushel.	
Nov. 7	—	—	o.s. and n.s. 3/6	..	3/7½ ex store	..	3/6½ to 3/8 b.; 3/8½ s.	..
8	Firmer; quiet	..	Do.	..	3/7½ to 3/8	..	3/6½ to 3/8 b.; 3/8½ to 3/9 s.	..
9	Firm; quiet	..	Do.	..	3/8 ex store	..	3/6½ to 3/7 b.; 3/8 s.	..
10	Steady; quiet	..	o.s. and n.s. 3/6 to 3/7	..	Do.	..	3/7 to 3/7½	..
11	Do.	..	o.s. and n.s. 3/6½ to 3/7	..	Do.	..	3/8	..
12	Firm; quiet	..	o.s. and n.s. 3/7	..	3/8	..	3/7 to 3/7½ b.; 3/8 to 3/8½ s.	..
14	—	..	Do.	..	Do.	..	3/7 b.; 3/7½ to 3/8 s.	..
15	Steady; quiet	..	Do.	..	3/8 to 3/8½	..	3/7 to 3/7½	..
16	Jan. 4/4½	..	Do.	..	3/8 to 3/8½	..	3/7½ b.	..
17	Firm	..	Do.	..	Do.	..	Do.	..
18	Sept. 4/5½	..	o.s. and n.s. 3/7 to 3/8	..	3/8½ to 3/9	..	3/7½ to 3/9½	..
19	Very firm	..	Do.	..	Do.	..	Do.	..
21	—	..	o.s. and n.s. 3/8 to 3/8½	..	o.s. 3/9 to 3/9½; n.s. 3/9	..	3/7½ to 3/9½	..
22	Very firm	..	Do.	..	3/9	..	3/8 to 3/9½ b.	..
23	Jan. 4/7½	..	o.s. and n.s. 3/8½ to 3/9	..	3/9 to 3/9½	..	3/8½ to 3/9½ b.	..
24	Steady; quiet	..	o.s. and n.s. 3/9 to 3/9½	..	3/10	..	3/9 to 3/10	..
25	Do.	..	o.s. and n.s. 3/8½ to 3/9½	..	3/10½ to 3/10½	..	3/8½ to 3/9½ b.; 3/10 s.	..
26	Dull; easier tendency	..	o.s. and n.s. 3/8 to 3/9	..	3/9 to 3/9½	..	3/8 b.; 3/8½ to 3/10 s.	..
28	—	..	o.s. and n.s. 3/8	..	3/9½	..	n.s. 3/9½ to 3/10 s.; 3/8 b.	..
29	Dull; offered lower	..	Do.	..	3/9 to 3/9½	..	3/8 b.; 3/9½ to 3/9½ s.	..
30	Jan. 4/5½	..	o.s. and n.s. 3/7 to 3/7½	..	Do.	..	3/8½ to 3/9½ b.	..
Dec. 1	Very dull	..	3/6½ to 3/7½	..	3/8½ to 3/8½ b.; 3/9 s.	..	3/8½ to 3/9½ b.	..
2	Oct.-Nov. 4/5½	..	Do.	..	3/8½ to 3/9	..	—	..
3	Afloat 4/5½	..	3/6½ to 3/8	..	—	..	—	..

STEAMER FREIGHTS.—For full cargo tramp steamers, South Australia to United Kingdom-Continent, the rate is 25/6 per ton (8½d. per bush.). For parcels, South Australia to London, 18/9 per ton (6d. per bush.); to Liverpool, 20/- per ton (6½d. per bush.); to Antwerp, 21/3 per ton (6½d. per bush.). Port Adelaide to Melbourne, 8/- per ton (2½d. per bush.); to Sydney, 10/6 per ton (3½d. per bush.).

SAILER FREIGHTS.—South Australia to United Kingdom-Continent, 23/- to 25/6 per ton (7½d. per bush.); to South Africa, 19/- to 20/- per ton (6½d. to 6¾d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for November, 1910, at the undermentioned stations, also the average total rainfall for the first eleven months in the year, and the total for the eleven months of 1910 and 1909 respectively:—

Station.	For Nov., 1910.	A'v'ge. to end Nov.	To end Nov., 1910.	To end Nov., 1909.	Station.	For Nov., 1910.	A'v'ge. to end Nov.	To end Nov., 1910.	To end Nov., 1909.
Adelaide	1.32	19.53	23.38	26.70	Hamley Bridge	1.38	15.49	20.82	20.54
Hawker	0.21	11.03	16.24	13.91	Kapunda	2.07	18.77	23.32	24.17
Cradock	0.33	9.83	14.01	12.20	Freeling	1.53	16.96	22.63	21.94
Wilson	0.48	10.68	16.90	12.68	Stockwell ...	1.42	19.41	21.68	23.13
Gordon	0.30	8.22	11.11	11.98	Nuriootpa ...	1.81	20.20	24.93	26.60
Quorn	0.28	12.90	17.89	14.84	Angaston ...	1.81	20.68	27.47	27.60
Port Augusta.	0.37	13.84	16.81	12.89	Tanunda ...	2.64	21.00	28.42	28.66
Port Germein	0.31	11.48	19.27	15.26	Lyndoch	1.45	21.88	25.90	27.69
Port Pirie ...	0.72	11.97	24.60	13.53	Mallala	1.47	15.83	20.93	21.44
Crystal Brook	1.04	14.19	21.95	17.83	Roseworthy .	1.32	16.51	22.34	22.23
Pt Broughton	0.54	13.42	20.14	16.38	Gawler	1.44	18.32	23.24	25.29
Bute	0.84	14.45	23.72	17.61	Smithfield ..	1.38	15.64	23.89	21.74
Hammond ..	0.26	10.00	17.95	14.29	Two Wells ...	1.34	16.74	19.78	19.52
Bruce	0.19	8.37	16.79	10.97	Virginia	1.58	16.58	23.95	22.58
Wilmington .	0.78	16.77	24.19	20.01	Salisbury ...	1.72	17.53	23.79	23.68
Melrose	1.02	21.81	30.64	28.32	Teatree Gully	1.55	25.13	29.70	38.76
Booleroo Cntr	0.64	14.75	20.81	16.93	Magill	1.11	23.87	25.56	36.75
Wirrabara ...	0.97	17.58	26.42	23.36	Mitcham	0.97	24.94	23.99	30.14
Appila	0.67	13.65	24.81	16.71	Crafers	2.35	44.24	51.15	66.66
Laura	1.08	16.62	28.62	23.50	Clarendon ...	2.34	37.48	24.30	43.18
Caltowie	1.15	15.95	22.43	18.48	Morphett Vale	2.07	22.42	25.88	31.32
Jamestown .	1.02	15.91	23.53	19.69	Noarlunga ...	1.87	19.25	25.36	27.45
Gladstone ..	0.73	14.82	19.77	16.45	Willunga	2.90	24.91	32.82	35.60
Georgetown .	1.17	17.07	25.99	18.12	Aldinga	2.62	18.98	35.70	29.34
Narridy	0.93	15.89	20.32	15.88	Normanville .	2.37	19.76	28.22	25.35
Redhill	0.44	15.47	25.95	19.89	Yankalilla ...	2.40	20.74	36.72	27.48
Koolunga	0.76	14.77	24.50	18.62	Eudunda	1.03	15.93	28.82	16.50
Carrieton ...	0.13	10.89	18.91	14.22	Sutherlands .	0.43	—	15.43	11.28
Eurelia	0.27	12.18	18.65	13.63	Truro	0.63	18.40	24.48	24.83
Johnsburg ...	0.17	8.94	15.19	11.87	Palmer	0.80	—	20.27	18.41
Orroroo	0.39	12.58	18.25	13.83	Mt. Pleasant.	1.24	25.91	29.93	32.00
Black Rock ..	0.15	11.13	19.03	14.22	Blumberg ...	1.28	28.45	30.96	36.03
Petersburg ..	0.44	11.90	17.11	13.16	Gumeracha ...	1.60	31.79	35.85	40.05
Yongala	0.76	12.66	17.94	14.96	Lobethal	1.44	34.37	34.64	46.79
Terowie	0.51	12.41	20.56	13.50	Woodside ...	1.48	30.13	35.57	45.39
Yarcowie	0.33	12.64	20.78	15.75	Hahndorf	1.37	34.92	47.98	44.38
Hallett	0.81	15.37	20.64	14.83	Nairne	1.57	27.91	32.76	37.82
Mount Bryan	0.75	14.86	21.23	14.96	Mt. Barker ...	1.72	29.84	32.88	39.54
Burra	0.99	16.85	25.28	18.11	Echunga	2.06	31.26	37.96	46.69
Snowtown	0.89	14.75	21.34	18.92	Macclesfield .	1.94	29.40	37.89	36.95
Brinkworth ...	0.82	14.90	23.22	16.81	Meadows	2.70	34.10	43.06	46.46
Blyth	1.07	15.15	2.109	21.86	Strathalbyn .	1.62	18.18	26.18	28.19
Clare	1.79	23.27	30.57	28.59	Callington ...	0.73	15.04	18.34	19.98
Mintaro Cntrl.	0.99	21.10	37.60	25.19	Langh'rne's B	1.66	14.03	24.39	16.91
Watervale ...	1.64	26.10	29.69	31.63	Milang	1.72	15.92	16.92	17.92
Auburn	1.45	23.10	31.21	33.73	Walleraro ...	1.09	13.12	19.57	17.93
Manoora	1.07	17.26	27.47	20.20	Kadina	0.81	15.11	19.13	19.64
Hoyleton	0.99	17.34	20.52	19.90	Moonta	1.10	14.35	16.72	20.27
Balaklava ...	2.11	15.12	21.71	18.43	Green's P'ns .	0.83	15.25	19.28	20.59
Pt. Wakefield	1.10	12.27	17.35	15.26	Maitland	1.58	19.22	21.93	25.87
Saddleworth	1.31	19.01	22.36	21.65	Ardrossan ..	1.31	13.19	17.14	17.28
Marrabel ...	1.26	17.12	22.17	21.63	Port Victoria	0.97	14.42	17.16	18.84
Riverton	1.44	19.66	26.70	24.99	Curramulka .	1.24	18.03	23.17	22.57
Tarlee	1.89	16.61	21.02	21.04	Minlaton	1.11	16.87	21.26	21.05
Stockport ...	1.25	15.36	17.53	18.45	Stansbury ...	1.05	16.30	20.51	22.62

RAINFALL TABLE—*continued*

Station.	For Nov., 1910.	Av'ge. to end Nov.	To end Nov., 1910.	To end Nov., 1909.	Station.	For Nov., 1910.	Av'ge. to end Nov.	To end Nov., 1910.	To end Nov., 1909.
Warooks....	1.10	16.00	22.61	18.46	Bordertown .	1.98	18.78	20.04	22.19
Yorke town .	1.63	16.96	22.28	18.62	Wolseley....	1.65	16.67	21.39	22.56
Edithburgh..	1.34	15.85	22.56	17.77	Frances.....	2.05	19.29	23.57	24.22
Fowler's Bay.	1.50	11.86	12.07	13.80	Naracoorte .	1.67	20.99	26.32	26.08
Streaky Bay.	0.76	14.89	17.05	18.00	Lucindale...	1.81	21.67	28.73	28.32
Port Elliot..	1.54	15.69	20.95	18.26	Penola.....	3.12	25.32	31.01	29.60
Port Lincoln.	1.93	19.35	24.13	19.39	Millicent....	2.47	27.61	36.43	38.05
Cowell.....	0.86	11.22	13.00	9.85	Mt. Gambier.	3.54	29.91	41.48	39.97
Queenscliffe.	—	17.60	—	18.89	Wellington..	1.55	14.27	18.74	19.87
Port Elliot..	2.24	17.05	23.45	19.83	Murray Bridge	0.88	13.33	20.62	19.83
Goolwa.....	2.51	16.94	24.51	23.74	Mannum....	0.79	11.12	17.32	14.17
Meningie....	2.89	18.08	21.92	24.33	Morgan.....	0.84	8.31	13.19	8.32
Kingston....	2.59	23.25	29.71	29.74	Overland Crnr	0.50	10.47	17.24	9.60
Robe.....	1.74	23.65	30.76	29.76	Renmark....	0.80	10.06	14.71	10.81
Beachport...	2.24	25.86	39.77	37.35	Lameroo....	—	—	17.29	17.71
Coonalpyn..	1.76	16.62	16.67	22.53					

DAIRY AND FARM PRODUCE MARKETS.

Messrs. A. W. Sandford & Co. report on December 1st:—

FLOUR.—City brands, £9; country, £8 15s. per ton of 2,000lbs.

BRAN.—11½d. to 1s.

POLLARD.—11½d. to 1s. per bushel of 20lbs.

OATS.—Local Algerians, 1s. 9d. to 1s. 10d. per bushel of 40lbs.

BARLEY.—Cape, 2s. to 2s. 2d. per bushel of 50lbs.

CHAFF.—£3 5s. f.o.b. Port Adelaide per ton of 2,240lbs.

POTATOES.—New locals, £9 to £10, Adelaide, per ton of 2,240lbs.

ONIONS.—New locals, £5 to £6, Adelaide, per ton of 2,240lbs.

BUTTER.—Factory and creamery, fresh in prints, 9½d. to 10½d.; second grade factories, 8½d. to 9½d.; choice separators, dairies, 8½d. to 9½d.; fair quality separators, dairies, 7½d. to 8d.; stores and collectors, 6½d. to 7d.

CHEESE.—Factory makes, new season's, for large to loaf, 4½d. to 5½d.; matured, up to 6d. per lb.

BACON.—Factory-cured sides, 7½d. to 8½d.; middles, 8d. to 8½d. per lb.

HAMS.—In calico, 10½d. to 11½d. per lb.

EGGS.—New-laid, 7½d. per dozen for prime, guaranteed.

LARD.—Skins, 6½d.; tins or bulk cases, 6d. per lb.

HONEY.—Prime clear extracted, 2½d.; dark and discolored, 1d. to 1½d.; beeswax, 1s. 1½d. per lb.

ALMONDS.—(Scarce) Softshells, Brandis, 7d.; mixed softshells, 6½d.; kernels, 1s. 4d.

LIVE POULTRY.—Good table roosters, 3s. 6d. to 3s. 9d. each; plump cockerels, 2s. 6d. to 3s.; hens and light cockerels, 2s. to 2s. 6d.; ducks, 2s. 6d. to 3s. 6d.; geese, 4s. 6d. to 5s. 6d.; pigeons, 9½d.; turkeys, 10d. to 11d. per lb., live weight, for fair to good table birds.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Dec.	Jan.			Dec.	Jan.
Amyton	†	—	—	Meningie	†	—	14
Angaston	529	10	14	Merghiny	539	1	5
Appila-Yarrowie	*	—	—	Millicent	549	13	10
Arden Vale & Wyndham ..	*	—	—	Miltalie	*	10	14
Arthurton	*	—	—	Minlaton	537	17	21
Balaklava	529	—	—	Mitchell	59	17	14
Beetaloo Valley	*	—	—	Moorabool	*	—	—
Belalie North	*	10	14	Morchard	526	—	—
Blyth	530	20	17	Morgan	*	10	—
Bowhill	*	—	—	Morphet Vale	†	20	—
Bowmans	*	15	12	Mount Bryan	*	10	14
Brinkworth	*	17	21	Mount Bryan East ..	528	3	7
Bute	537	—	13	Mount Gambier	549	—	—
Butler	*	—	—	Mount Pleasant	545	9	13
Caltowie	528	1	14	Mount Remarkable ..	*	15	12
Carrieton	524	15	12	Mundoora	*	—	—
Cherry Gardens	542	13	10	Murray Bridge	540	—	—
Clare	531	16	13	Nantawarra	533	14	11
Clarendon	*	12	9	Naracoorte	550	10	14
Colton	*	17	14	Narridy	*	—	—
Coomooroo	524	—	—	Northfield	534	—	—
Coonalpyn	*	—	—	Orroroo	*	—	—
Cradock	*	—	—	Parrakie	511	3	7
Crystal Brook	*	—	—	Paskeville	*	10	14
Cummins	*	10	14	Penola	550	3	7
Davenport	525	—	—	Penong	*	—	—
Dawson	*	—	—	Petina	*	—	—
Dingabledinga	*	9	13	Pine Forest	537	—	—
Dowlingville	*	—	—	Port Broughton	529	—	—
Elbow Hill	538	—	—	Port Elliot	*	17	21
Forest Range	543	15	12	Port Germein	*	—	—
Forster	*	—	—	Port Pirie	*	—	—
Frances	*	9	13	Quorn	*	—	—
Freeling	533	—	—	Redhill	*	13	17
Gawler River	533	—	—	Renmark	†	—	—
Georgetown	*	17	14	Rhine Villa	*	—	—
Geranium	539-40	31	28	Saddledworth	*	16	21
Green Patch	538	12	9	Salisbury	535	—	—
Gumeracha	*	12	9	Shannon	†	—	—
Hartley	544	10	—	Sherlock	*	10	—
Hawker	*	12	16	Stockport	*	12	—
Hookina	*	—	—	Strathalbyn	*	19	16
Johnsburg	*	—	—	Sutherland	541	—	—
Kadina	*	15	12	Tatara	550	—	—
Kalangadoo	*	10	14	Uraidla and Summert'n ..	547	—	—
Kanmantoo	†	9	13	Utera Plains	*	10	14
Keith	†	—	—	Waikerie	542	—	—
Kingscote	544	6	3	Watervale	*	—	—
Kingston	548	31	28	Wepowie	†	—	—
Koppio	539	28	—	Whyte-Yarcowie	*	—	—
Kybybolite	*	15	26	Willowie	*	—	—
Lameroo	*	—	—	Willunga	547-8	3	7
Lipson	*	—	—	Wilkawatt	542	10	—
Longwood	544	14	11	Wilmington	527	15	11
Lucindale	*	17	—	Wirrabara	527-8	—	—
Lyndoch	†	15	—	Woodside	*	—	—
Maitland	*	3	7	Yallunda	†	—	—
Mallala	*	—	2	Yongala Vale	*	—	—
Mannum	*	31	28	Yorketown	*	10	14
Meadows	545	—	—				

* No report received during the month of November.

† Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.
(PETERSBURG AND NORTHWARD.)

Carrieton, November 17.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Gleeson (chair), Ormiston, Earl, Radford, C. T. and J. F. Fisher, Williams, Byerlee, Beerworth, King, and Bock (Hon. Sec.)

SEASON'S PROSPECTS.—It was reported that although the frost had done little damage the crops should yield fairly well, provided they were not damaged by storm. One member present had found the wheat grown with stable manure affected by frost more than other parts of the crop, while another had had the opposite experience, and had succeeded in producing very fair wheat on hard patches by the application of stable manure. Some fairly good Federation wheat was tabled, also a bunch of Neuman's Early, in which the grain was pinched, grown without super. The Chairman said that in the experimental plots under his care there was not much difference to be seen between plots grown with super, and those without, but it was expected that there would be a difference in the quantity and quality of the grain in favor of the manured plots.

WEIGHBRIDGES.—It was decided to ask other Branches to co-operate in requesting the Government to erect a weighbridge at every railway station in the State where wheat was grown, to weigh the grain in bulk and avoid disputes which now occurred in the market.

BLUE WEED.—It was also decided to ask other Branches to co-operate with the object of preventing the blue weed (Salvation Jane, Paterson's Curse, &c.) from being declared a noxious weed north of Petersburg. It was good fodder for sheep, especially in times of drought, and if it was desired to eradicate it the sheep would quickly do it.

Coomooroo, November 7.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Berriman (chair), Avery, Robertson, and Brice (Acting Sec.)

CARRYING CAPACITY OF FARMS.—Mr. Brice read a paper under this title. The high price of land, he said, made it necessary for farmers to produce as much as possible from their holdings. Paddocks on a farm of 1,200 acres or less should not be more than 70 acres in area, but in larger holdings they might be up to 100 acres each. Water should be provided at different parts so that stock had not to be driven about. Cattle and horses could be put in a paddock for a while and then sheep could follow them. Sheep especially benefited by a change of pasture, even if there was less of it; the actual change did them good. He quoted an instance in which a farm could carry only one sheep to five acres, and they were poorly kept at that. This farm changed hands and division fences were put in. It now carried one sheep to two acres and kept them in condition. In addition to this, about 300 acres was cropped. In small paddocks the weeds could be eaten down by sheep and this was a big consideration. At harvest time the wheat could be carted out of small paddocks fairly quickly and the sheep be put on the stubble without delay. In this district the crops would stool and root better if fed off in the early winter. Further, land that had been grazed for about four years would be much benefited by being brought under cultivation again, so that wheat-growing and sheep and cattle raising could be most profitably worked together. Well-grown paddocks should be fed down with big stock first. One reason for this was that in the latter part of spring grass seeds caused blindness in sheep with all its attendant evils. Plenty of shelter should be provided for sheep and cattle alike, for it was required both in summer and winter. In the absence of natural shelter a few furze hedges, if planted, would soon provide what was necessary. The loss of sheep in cold weather, after shearing, would often be 10 times the cost of the shelter. Trees formed a better shelter than sheds.

for horses, when not actually feeding in the stable. In discussing the paper, Mr. Avery agreed that small paddocks were best. In large paddocks the sheep ate the feed right off and it had no chance to pick up; consequently, the sheep got very low in condition and were not profitable. He had found thatched roofs to shelters and sheds very satisfactory. Mr. Berriman said boxthorn made a good breakwind for stock and it grew quickly. Gums were better than pines for shade. Flies and ants were attracted by the pines, but the eucalyptus in the leaves of the gums seemed to drive these pests away. He thought iron was best for roofing and enclosing a stable, as straw let the water through after a time. Continually adding more straw to the roof ultimately broke up-rights and rafters. Mr. Robertson suggested that a ceiling of straw could be put under an iron roof, and so durability and fairly even temperature would both be secured. The iron would also catch a fair quantity of rainwater. In replying, Mr. Brice, said that hedges would need to be protected from the stock while young. He considered a thatched roof best. If properly put on it lasted a long time.

PROTECTION OF HAYSTACK.—Some of those present thought iron, put on in sections, was the best and cheapest covering in the long run for haystacks. Mr. Brice preferred thatching, but all agreed that some more satisfactory covering was needed in this district, as tons of hay were ruined annually by the rain soaking in where the mice had been at work.

HARVESTING.—This subject was also introduced by Mr. Brice. In view of the high price of labor he considered the complete harvester was the best machine to use. One man and a boy could with this machine take off a crop that would need three men with stripper and winnower. The harvester would do more work than the stripper in a day, as it could be used in the morning when the stripper would not thresh the grain out. Considerable time was lost with the stripper in going to and from the heap, whereas, the harvester comb need not be taken out of the crop all day. Mr. Berriman thought it would not pay in this district to discard two good strippers and a winnower and buy a harvester. Mr. Avery said that a man who previously used two strippers would need two harvesters.

Davenport, October 27.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Bothwell (chair), Roberts, Nestor, Holdsworth, Messenger, Hobby, Rogers, Gosden, Lecky (Hon. Sec.), and a number of visitors.

SAND DRIFTS.—The following discussion took place concerning sand drifts:—Mr. N. Rogers (Woolundunga) said that sand drift was due to three causes—over-stocking, the cultivation of unsuitable land, and natural well-defined air currents. Before the last drought there was a period of good seasons, and during that time the country was over-stocked. The land was cut up, and then, when the drought came and the stock were travelled, the trouble was intensified. Thousands of acres of this country which had been cultivated were areas of drifting sand. Experts had considered that there was no way of stopping drifts due to natural causes. The drift channels due to air currents of more or less regularity were easily defined. There was one from Port Patterson to Clear View through Stirling. One section in the line of drift was worse in this good season than it had been before. Touching the hills of sand as distinct from the large wind-swept areas, he would advocate cutting down every bush and removing every obstruction, and then harrowing. On Horrocks Pass Road the council had dug up the bushes on each side of the road for about half a chain. Other obstructions had been removed, and the sand had now no chance of accumulating. Mr. J. H. Michael's experience had proved that the main cause of the drift was drought. Cultivation did not cause it, except in areas where the surface was very loose and from which the bushes had been removed. Hundreds of acres were drifting simply because they had not been cultivated. When, after drought periods, the natural bush had died out, the country became bare, and was simply a wind-swept waste. This was the country to cultivate, and if it were seeded with a drill the results would be successful. Five years ago he had treated 200 acres of this country and reaped two bags to the acre. The most difficult parts to deal with were the isolated sandhills or ridges. These should be sown with the drill, half a dozen times if necessary. May was the best time to plant. About $\frac{1}{2}$ bush. of wheat and $\frac{1}{2}$ bush. of oats to the acre drilled about 3in. deep was best. The surface should then be covered with bushes or any other light material that would keep the surface still. These soils were wonderfully productive in dry seasons. He knew no country that stood bad seasons so well as the reclaimed drift areas. Mr. J. Holdsworth gave a short account of the measures taken in 1878-9 at Port Fairy and Warrnambool, Victoria. In those places

the rainfall was good, and marram grass had proved effective. The local ridges and sandhills could, he thought, be conquered if tackled piece by piece, working always from the windward side. Cudmore's Hill could be planted and watered. Concerted action would be necessary to reclaim any large area, but whatever was done should be from the windward side, and with regard to the original source of the drift. Mr. Nestor agreed that obstructions caused the sand to accumulate, and that travelling stock were a contributory cause. Mr. Michael thought it would be best not to harvest wheat on drift soils until a certain proportion of the seed had fallen to the ground. [Such an important matter as this should not be allowed to end with the discussion. Could not the Branch arrange for the suggested remedies to be put to a practical test? Something of great benefit might in this way be proved, and then put into practice on larger areas.—Ed.]

Morchard, October 15.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. McCallum (chair), Kupke, Kirkland, Rafferty, Jasper, and J. B. McDougall (Hon. Sec.).

OATS FOR PROFIT.—A short paper on this subject was read by Mr. Jasper. He was of opinion that it would pay to grow more oats than farmers usually did. He had put in 10 acres of wheat on land formerly under oats, and 10 acres where wheat had been previously grown. Where the wheat followed oats the yield was 3bush. per acre more than on the other plot. Land that would produce 20bush. of wheat if treated in the same way would produce 30bush. of oats per acre. Taking wheat at 3s. 6d. per bushel, the return was £3 10s. an acre, while the oats at 2s. 6d. would return £3 15s. per acre. He preferred Cape or Champion oats for loose hay for stock. Algerian oats were preferable for chaff, as they grew higher. While advocating the production of oats, he did not recommend putting such large areas under this crop as to make the labor too great. He preferred the damp-weather stripper and winnower for harvesting oats. Although it involved more labor than the complete harvester, the cocky chaff was splendid feed for stock. A lengthy discussion followed. Members agreed that it would pay to grow more oats. The succeeding crop of wheat benefited, and certain "soda" land which would not grow wheat, would produce oats. The feed in the oat stubble was worth a good deal.

Morchard, November 19.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Kitto (chair), Kupke, Scriven, jun., Jasper, Reichstein, Toop, Munro, Parsons, Rafferty, McCallum, Kirkland, W. Toop, J. and J. B. McDougall (Hon. Sec.).

HARVESTER V. STRIPPER.—Mr. Kupke read a paper on this subject. With an up-to-date, damp-weather stripper, he said, a farmer could get to work quite as early as, if not earlier than, with the harvester. Some people said the harvester did not waste grain. He had seen enough grain wasted by two harvesters to buy two new strippers and pay a good part of the cost of a motor winnower. He considered a crop of 300 acres could be just as cheaply harvested with the stripper and motor winnower as with the one machine, and in addition the farmer would have most of the weed seeds in a bag and a good heap of cocky chaff, instead of both being scattered all over the paddocks. He believed the stripper and motor winnower would last twice as long as a harvester. By winnowing out of the heap and carting at once to the buyer the bags weighed more than if left standing in the fields for weeks. He also found the stripper worked more satisfactorily than the harvester in a poor crop of, say, 2bush. or 3bush. per acre.

CULTIVATING LAND BEFORE FALLOWING.—Mr. McCallum read a paper, in which he pointed out some of the benefits derived from cultivating land before fallowing. The paper ran somewhat as follows:—Cultivating land before fallowing helps to clean the land by causing all kinds of weeds to grow. A great deal depends upon the class of land and the condition in which the soil is left after cultivating. The time of cultivating and the treatment the land receives after it has been cultivated are all-important considerations. The best condition to have the land in after cultivating, so that it will be ready for the plough at fallowing time, is with a fine loose surface of about 2in. deep. All weeds, especially wild oats, will then start most readily. It is not always easy to get the land into the right condition with the cultivator alone, and sometimes it is advisable to harrow after cultivating. This helps considerably to form a loose surface. The

land should remain in a loose state up to the time of fallowing. Soil that is inclined to run together or set hard should only be cultivated just before fallowing. It is important that all stock should be kept off the land after it has been cultivated, especially in wet weather. Cultivating before fallowing enables a farmer to continue fallowing even if a dry spell sets in, and he can also fallow later in the year, for when the land has a loose surface the plough will readily go into it. Many farmers object to this method of working the land on account of the extra time needed for cultivating; but it must be remembered that the time is partly regained on account of the cultivated land being easier to work. Also a rather larger area can be done per day with the same strength. [It is regrettable that no discussion is recorded by the Hon. Secretary on these two important subjects. —Ed.]

Wilmington, November 17.

(Average annual rainfall, 17½ in.)

PRESENT.—Messes. Payne (chair), Slee, Jacobs, George, Hill, J. and W. Schuppan, Hannagan, Doll, Zimmermann, and Jericho (Hon. Sec.).

FARMING ON SMALL CAPITAL.—A lengthy discussion took place on Mr. Dall's paper (see page 271, October issue) on "The Best Means for Young Men to Start Farming with Small Capital." It was agreed that everything depended upon the character and energy of the man, although some members were convinced that £100 was too small an amount to start with. They thought it should be at least £300.

Wirrabara, October 22.

(Average annual rainfall, 30 in.)

PRESENT.—Messes. H. E. Woodlands (chair), Borgas, Pitman, Hoskins, A. Woodlands, Bowman, Hollett, Stevens, Curnow, P. and H. Lawson (Hon. Sec.), and two visitors.

EXPORT OF FRUIT.—The following paper on this subject was read by Mr. Pitman:—"To be successful in exporting fruit, growers must pay attention to the whole business from start to finish. No careless or dishonest grower will succeed in the export trade. Buyers require the best of fruit, well graded, and properly packed in suitable cases. After securing such cases the gathering of the fruit must be done by persons who will handle it carefully. Each apple or pear must be picked separately and placed in the case with care, and not *dropped in*. When carting, cases must not be bumped about. The next process is to examine each apple to see that it is sound and up to the required grade. Then cut off the stems, wipe the apples, and wrap them in tissue paper. They are then ready for packing in the cases. After examining each case to see that it is properly nailed up cover the bottom with wood wool. Proceed by placing the first apple in a corner. If three will not fit tightly across the end, and there is not room for a fourth, put the layer in at an angle and so make room for the fourth. In this way it is possible to get them tight, and that is the secret of packing. If in finishing off each layer there is a space not large enough for the average grade, put in a smaller apple. These smaller apples are better than filling such spaces with wood wool. Buyers dislike much wood wool, and we have made a practice of using smaller apples for finishing off when necessary, and the prices we have obtained for our consignments have usually been within a few shillings of the top market price for each kind. When finishing off the case try to have the last layer fully half an inch above the top of the case, to keep the fruit firm when nailed down. If the apples move on handling the case the packing is faulty, and the contents will soon be damaged. This will mean loss to the grower, as all losses fall on the grower. Care should be taken to properly nail down the cases, using nothing shorter than 2 in. nails. Be careful to brand true to grade. Do not mark them sound if they are unsound. The law allows growers to ship unsound fruit, but this is a grave mistake, and the sooner it is altered the better for everyone. Among many markets we have found Hamburg the best. The London market is always overcrowded, and all cargo for this market has to be lightered from the steamers, as they cannot get into the wharf. At most of the other markets the steamer draws up alongside the wharf and unloads direct into the saleroom, thus saving expense to the grower. To place fruit on the overseas markets costs about 6s. 3d. per case. This means that it must bring at least 13s. 6d. a case to return a profit to the grower. Therefore, only the best fruit should be exported. Soft varieties of pears require different treatment from apples. They are usually packed in trays, three to the case, but the harder ones may be packed in the same manner as apples. I have been informed that pears carry better if the stems are not cut off when

packed for export." In the discussion which followed it was said that if exporters would be more careful in packing, it would be far better for the whole State. Some people could put 40lbs., while others could only get 33lbs. into the same sized case. Mr. P. Curnow considered Jonathan was the only variety that it paid to grow for export.

PROBLEMS FOR HORSE-BREEDERS.—In reply to a question, Mr. P. Lawson said it was better to breed from a four year old mare than to wait until she was six. He was in favor of compulsory examination of stallions by duly qualified men. Mr. Curnow said he had spent £12 in service fees and had only got one foal. He therefore was fully alive to the need for the registration of stallions. The Branch then carried a resolution in favor of veterinary examination of stallions.

Wirrabara, November 12.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. Curnow (chair), W., E. J., and W. H. Stevens, Pitman, Bowman, C. J., and E. Hollett, Borgas, Hendrick, Blessing, Hoskins, Woodlands, Passow, P. and H. Lawson (Hon. Sec.), and 11 visitors.

HORSE AND CATTLE DISEASES.—An address on various diseases of horses and cattle was given by Stock Inspector Williams, and microscopic slides employed to illustrate his remarks. In reply to questions, Mr. Williams said that for castrating colts the emasculator was as good as the older method of cutting. Some preferred one method and some another. Stockholm tar was the best application for lambs after castrating.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Caltowie, November 12.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. N. E. Hewitt (chair), Petatz, J. and G. Lehmann, Williams, Hewitt, Batten, Potter, Graham, Wilsdon, Ferguson, Collins, and F. Lehmann (Hon. Sec.).

VISIT TO ROSEWORTHY COLLEGE.—Mr. Hewitt reported on his visit to the College on Farmers' Day. He was disappointed that there was not a better opportunity to show the working of the stone-gatherer. Many of the plots, he said, looked well, and also the horses, cattle, and sheep. The feed was abundant—a fact which he attributed to the heavy manuring practised. He thought the shearing-shed and number of implements and machines were out of proportion to the size of the farm. He also commented upon the weeds on the fallow. The pigs and fowls he considered very creditable.

Mount Bryan East, November 12.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. J. Thomas (chair), Gare, W. H. Quinn, Tralaggan, F. and R. Thomas, Doyle, and T. Quinn (Hon. Sec.).

HAYMAKING.—The Hon. Secretary read a short paper on "Haymaking." It was now time, he said, to see that binders were in order for the hay season. It was best to cut the crop when the grain was almost full, if for chaff, or a week or two earlier if intended to be fed long. Oats should not be cut green or they would be bitter and the horses would not eat the hay. The man working the binder should see that the sheaves were well packed and tied in the right place. Hay should be stooked as soon as possible after being cut. Loss of color and a lower feeding value was the result of leaving the hay exposed to the sun and unstooked for any length of time. He preferred fairly large stooks made upright. Hay stooked on its side was liable to mildew. A week or 10 days should lapse before stacking to allow the hay to dry. No time should be lost when once the hay was fit for the stack, but if put in too green serious damage through the heating was likely to result. In stacking, the outside sheaves should be laid so that they overlap each other.

This would prevent slipping. The centre of the stack should be higher than the outside. Iron for roofing, though expensive at first, was the cheapest covering in the long run, and would pay for itself in a few years in hay saved. In the discussion which followed one member thought that for chaff which was to be sold the hay should be cut green, but if for his own horses he would wait until there was some grain in it. Another member thought hay should be left in the sun for a day before being stooked.

Port Broughton, November 11.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Barclay (chair), Pattingale, jun., Whittaker, Hill, Harford, Hoar, Donnelly, Pattingale, jun. (Hon. Sec.), and one visitor.

CONGRESS NOTES.—Considerable discussion took place after delegates to Congress had given their reports. The Branch, as a whole, strongly favored compulsory examination of stallions, and was fully alive to the need for and value of selection of seed wheat.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, November 12.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Wishart (chair), Friend, Plush, Sibley, Smith, Ball, Clark, Swann, Giles, Stephens, Playce, Matthews (Hon. Sec.), and three visitors.

TRIP TO RENMARK.—Mr. Plush gave an interesting account of his trip to Renmark. He paid considerable attention to the orchards and vineyards. The absence of spot and codlin moth in the district was a great advantage, and the wonderful growth of lucerne was a remarkable feature. It was possible to feed two cows and a horse all the year round on an acre of ground with the aid of this fodder.

ROSEWORTHY COLLEGE.—Since last meeting members had in company with the Lyndoch Branch visited the College. They felt that they had derived benefit from the visit, and also from meeting with the neighboring Branch. The College farm and the poultry station were highly spoken of.

Balaklava, October 8.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Goldney (chair), Anderson, Hoepner, Thomas, Spillane, Neville, Robinson, Lally, Wagener, Roberts, Tuck, Burden, Traeger, Uppill, Banyer (Hon. Sec.), and one visitor.

CARE OF FARM IMPLEMENTS.—Mr. Hoepner read the following paper:—"In this country the cost of farm implements and machinery is very heavy, especially in regard to repairs and duplicate parts, the cost of such being usually about double the price for the same proportion when new. Thus it is of the greatest importance that we take every care of those we have, and it is surprising how long the life of an article may be lengthened and its efficiency preserved by care and good treatment. The first thing is to provide a good shelter. I believe it would pay best to build a substantial stone shed with an iron roof, as it would last for years and be practically fireproof; but if this could not be done, some kind of a shed with a straw roof should be made. All sheds, where possible, should face the south, as the sun cannot shine on the machinery so much as if facing east or west. All woodwork should be given a coat of paint when it begins to dry up or crack. The article must first be well cleaned of grease and dirt, and while doing this you will be surprised to find what a lot of nuts, if not bolts, are lost or loose. This work should be done in the summer time, while the wood is dry, and the nuts and bolts replaced and screwed up. Nothing is worse for a machine than to run with loose nuts. If attended

to each year, no difficulty will occur; but if neglected many of the bolts will turn in the wood when screwing up is attempted. Before an implement goes to the field at the start of the season it should be thoroughly overhauled and put in repair. If it be a complicated machine, such as a harvester or binder, and has to do work on rough land, it is of the greatest importance to make all snug and tight. About 90 per cent. of the breakages are caused directly or indirectly by looseness of nuts or parts. Keep a small supply of bolts and nuts of different sizes likely to be required with the machine. If nuts persist in coming off, put on two nuts if the bolts will allow it. All machines should be well greased or oiled, as the case may require; yet this is often neglected. For harvest machines in hot weather avoid thin oils, as they are not satisfactory for wear. An oil with some body in it is required. See that the oil is getting well into the bearing, or it will soon be cut out." Mr. Anderson said it was important that all slack nuts should be tightened before the machinery was started. He believed hundreds of pounds were lost every year for want of proper care of implements. Things were now better looked after than a few years ago, but even now sufficient care was not taken of them. Mr. Neville said he would rather that the shed should face the east, because rain did more harm than sun. Mr. Spillane thought it best to attend to broken parts as soon as discovered, and worn-out parts at the end of the season, if not before, so that the machine would be ready for the next season. Mr. Roberts thought the shed should be enclosed all round to protect the machinery both in summer and in winter. Mr. Wagener had had difficulty with the nuts on a mower He could not keep them tight. He put on a leather washer, and had had no trouble since. If the shelter-shed were closed all round it would keep the poultry out as well as the weather. Mr. Traeger preferred the shed enclosed all around, but there should be ventilation to keep the place cool. A space of 9in. or 10in. around the roof made a shed cool that otherwise would be very hot. Mr. Robinson thought enclosed sheds should be ventilated, so that air could get around the machinery. Unless well ventilated, it got very hot. A farmer gave nearly £100 for a harvester, and it was worth looking after. Mr. Uppill agreed as to the necessity for properly protecting the machinery and implements. A coat of paint helped to preserve the woodwork.

Blyth, October 25.

PRESENT.—Messrs. McEwin (chair), Dunstone, Zireck, Ninnes, Gell, Roberts, Eime' Wiltshire (Hon. Sec.), and two visitors.

IMPROVEMENT OF WHEAT BY SEED SELECTION.—This matter was discussed along the lines suggested in a letter from the Acting Secretary to the Minister of Agriculture, and a committee was appointed to go into the matter and make arrangements.

POULTRY.—A paper on "Poultry-keeping," to the following effect, was read by the Hon. Secretary:—"I wish to consider this subject from the farmer's standpoint of utility. Poultry-keeping pays if given a little commonsense and attention. The successful farmer is not content to grow only wheat and wool, but makes his side lines add to the general revenue. Of these side lines none will give a greater return for the amount of care bestowed upon them than poultry. The average farmer has neither time nor inclination to go in for fancy poultry. We want fowls that will lay well, and are of sufficient size to sell for table birds. In the first place get a good class of fowl. Do not get the idea that any crossbred or mongrel will lay as well as others. The best breeds for this district I consider are Orpingtons, Wyandottes, and Leghorns. The two former are good winter layers; they are fairly large framed and make good table birds, and are also good sitters. Leghorns are non-sitters but are excellent layers, especially in spring and summer; but being smaller are not so good for the table. If your runs are large enough for heavy and light breeds have the three breeds mentioned. For breeding purposes do not be content with buying a bird that is simply of the breed you are after; but get one that is of a *known laying strain*, even if you have to pay more for it. Breed your own stock. It is a poor policy to set eggs from a neighbor's hens and let the chicks run with your fowls thinking you are improving your fowls. Put up a pen and a house of iron, with as little wood as possible about it. If you do not feel disposed to buy a rooster and hens to breed from buy a pure-bred rooster of a good laying strain, and select about 10 of your best hens and breed from these, getting rid of your present stock as soon as convenient. Get early chicks: those hatched in August or early in September will lay when eggs are dear. Do not keep any hens, except for breeding purposes, over two years old, as they will not pay after that age. Cockerels should not run loose, as they worry the hens and never put on condition. Put them in a pen and fatten them for market."

Clare, October 14.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. McCreth (chair), Bowman, Keane, Miller, Victorson, Daly, Menzie, Scales, Maynard, Pryor, Kollasche, Pascoe, Kelly, J. H. and P. H., Knappstein (Hon. Sec.).

INCUBATORS, BROODERS, AND CHICKENS.—The following paper was read by Mr. Keane : —“ We read glowing accounts about poultry-farming—generally very encouraging to one who thinks of starting a poultry farm. But this, like all other branches of agriculture, needs practical experience to make any headway, and I think it well for a beginner to seek the advice of those who are veterans in this one branch, in order that they may avoid many stumbling-blocks. He must also be willing to give the whole of his time to the work. It is a great mistake to try to raise poultry on a large scale without having had some little experience with incubators and brooders. To jump straight into poultry-farming, expecting to make a paying business, with only theory to build upon generally proves fatal. I had handed over to me in my first experience with poultry five incubators containing 900 eggs, and chickens previously hatched 500, which, of course, had to be cared for. This, I found, wanted practical experience. Things became rather muddled at first, but as time went on they gradually straightened. I have heard people say that incubators are a waste of time, but I found that to be altogether incorrect. One hundred and fifty thousand incubators were sold in America in one year. Those figures do not indicate that incubators are a waste of time. By artificial incubation not only can large numbers of eggs be hatched, but at a time when the broody hen is scarce. An incubator cannot run itself—the best of them need watching. There are many details which should be carried out, such as—taking care that the incubator is placed in a well-ventilated cellar or room not subject to much variation in temperature; also that it is thoroughly clean. After each hatch a pinch of sulphur should be burnt in the hatching chamber, to kill any germs that may be there. Care should be taken in cleaning the lamp and wick, by means of a soft cloth, so that no soot accumulates. Always see that the eggs are turned before handling lamps or kerosine, as the slightest quantity of kerosine is fatal to the germ. Eggs should be turned twice a day at regular intervals up to the eighteenth day. It is a good plan to mark the egg on surface turned up, so that the mark will point out any egg that has missed turning. Eggs soiled in any way should be cleansed by washing in luke-warm water. If directions given with each incubator are carefully carried out fair hatches will result. Any difficulty in changes of temperature and airing of eggs can be overcome by experience only. The thermometer must be accurate. The bulb should rest on an egg containing a live germ; this can be ascertained by testing on the third and seventh days. A broody hen for the first four or five days will hardly leave the eggs, and when she does it is only for a short time, but as her time of sitting goes on she does not mind leaving the eggs for an interval of 20 minutes; this is, I think, proof that the eggs after the first week need airing for a little longer time than it takes to turn them. After the fourteenth day eggs, when turned, may be left out to cool down to the temperature of your hand. But in leaving the drawers of the incubator out for five minutes the machine cools down considerably, and when the drawer is replaced again it is some little time before the temperature is raised to 103°. As soon as the eggs come in contact with the hen's body the 103° is applied, and it is really no time before the temperature is regained; therefore with machines that have no false fronts something of the sort should be made to close the machine while the drawers are out. Moisture is a very important item in good hatching, and should be used with judgment, according to the dampness of the atmosphere. For the earlier hatching I think if moisture is applied after the fourteenth day it is sufficient, but when the atmosphere becomes drier no harm can be done by applying moisture straight away. The instructions with most incubators say do not interfere with the drawers whilst hatching is taking place, but I found with machines that have the nursery at the top, and do not allow the first chicks hatched to get away from those that are hatching, it was necessary to remove all empty shells and dry chicks, as the earlier chicks hustling about cause the empty shells to coat the eggs that are not yet hatched, thus preventing the chicks from getting clear. Chicks need no food for 36 hours after they are hatched. The yolk of the egg having been absorbed prior to exclusion, the chicks are born full provisioned. I have read that chicks would live for 10 days to a fortnight, such time being given for the chicks to learn the choice of the food from the mother. When the chicks are removed from the nursery of the incubator they still require warmth. This can be supplied by the hot-air brooder, which has the temperature raised to about 75° to 80° by the aid of a lamp. The difficulty with this brooder is to keep the chicks away from the flue,

which contains the greater part of the warmth. This flue, being in the middle of the darker compartment, is more attractive to the chicks than their food during the day. Then at night, the flue still being a great attraction, the chicks crowd and crush during the night instead of resting, the result being that the weaker chicks are trampled down and suffocated by the stronger ones. The second method of brooding chickens is by one that is termed the fireless brooder, which I think would be the means of preventing overcrowding, because the temperature is more equalised on account of the warmth given off from the chicks' bodies being reserved. Chicks should be provided from the start with clean fresh water in a shallow vessel, which should have a stone placed in the centre, to prevent the chicks from getting too wet. They should also have grit. This can be supplied by having the brooder floor covered with a thin layer of sand. The food for the first two days should be infertile eggs boiled hard, well broken up and mixed with twice their weight of stale bread-crumbs. I was advised to feed after the first few days on crushed wheat morning and evening, fed amongst a little chaff. The chaff caused the chicks to scratch. This, with a little green food in the middle of the day, was said to be sufficient, but I am of the opinion now that it was a mistake. The chickens on this diet kept lively for a time, grew plenty of feathers on the wings, but the body failed to grow in proportion. As they became older the wings drooped, chicks became weaker, and eventually died. There may have been some other cause for this, but I am of opinion that it was caused through feeding on crushed wheat and green feed alone. I changed the food in the morning, and gave a mash of equal parts of bran and pollard; this answered much better, but was not yet perfect, the reason being that meat food was wanting. The first reason I had to think that meat food was lacking was the action of a number of chickens that were in a brooder towards a chicken that had blood showing on one of its claws through the skin being knocked off. This blood was certainly an attraction to the other chicks. They would have killed it had it not been removed. With another batch of chicks I had a similar experience. The chick had its leg picked away and part of its body before I noticed it. It is now recognised that chicks need meat food. I began to feed animal food with a mash in the morning—scraps and fresh rabbits put through a sausage machine, bones as well as flesh. Not long after this the Government meat meal was put on the market. This used at the rate of 1lb. to 12lbs. mash three times per week gives the chickens much more the appearance of the hen-raised chick. I have been given to understand that chickens or grown fowls fed with too much animal food will suffer from enlarged liver, but I do not know anything of it. I think when chicks can forage for themselves, and are allowed to do so in a garden or orchard, it would be wise to reduce the meat food. When chickens are allowed a free run in this way a sharp eye should be kept on hawks, magpies, and laughing jacks, as they can do a great deal of harm in a short time. The mash for chicks should be mixed stiff. Where green food has to be grown and cultivated for the purpose, kale or lucerne, kale being preferable, unless the lucerne can be irrigated. In the New South Wales *Agricultural Gazette* there is an article on a green fodder known as Chou Moillier, or marrow kale. A portion of the crop mentioned in this article produced a yield of 27 tons 17cwt. of foliage per acre, and in addition 38 tons 18cwt. of stems per acre. According to the *Gazette* the stems are of no use except for pig feed, but I think if they were boiled they could be made use of for poultry. Anyone intending to go in for poultry should build a brooder house, so that the temperature can be kept nearer the mark without changes of the weather interfering. An incubator house also should be built, but where the expense for both cannot be met, and a fair place is obtainable for the incubators, I think the brooder house should be built first." In the discussion which followed Mr. Bowman stated that turkey eggs were very easy to hatch, but the young turkeys were very difficult to rear. He advised hatching the eggs in an incubator and then giving the young turkeys to a hen to rear, as the brooder was not much use to rear turkeys in. The Chairman thought incubators were the right thing to hatch chicks with, as it was possible to have chickens at any time of the year by using it, and there was not the trouble of having to hunt up broody hens in the off season.

MANURING ORCHARDS.—Having discussed this question at a previous meeting, the following resolution was carried:—"That this Branch considers the best and least expensive method of experimenting with orchard and vineyard manures, also to find remedies for diseases such as bitter pit in apples, would be for the department to select representative orchards in each fruit-growing centre, to supply manures, and instructions as to how to conduct the experiments. The work to be done under the supervision of an officer, who would visit the experiments, see that instructions were being carried out, and note the results." The hope was expressed that other Branches in fruit-growing districts would discuss this resolution,

Freeling, November 11.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Neldner (chair), H. and C. Koch, Shanahan, Leske, J. A. and J. A. Mattiske, jun., Heinrich (Acting Sec.), and 26 visitors.

HORSE COMPLAINTS.—A few hints in regard to horse complaints were given by Mr. E. Morris. In the course of his remarks Mr. Morris mentioned several diseases and their remedies, and said that, in his opinion, strangles was not a dangerous complaint when there was a discharge—provided the horse was properly cared for. Horses' teeth should not be unnecessarily interfered with. He deprecated the practice of allowing manure and urine to accumulate in stables, and recommended the liberal use of lime to sweeten them. Rock salt was of value, and should be placed in the mangers. He considered that since the advent of commercial fertilisers there had been more disease among horses; consequently he attributed the cause to the fertilisers. With this last opinion, Mr. Heinrich could not agree. With the use of manures, and through early sowing, some of the crops became rather rank. The hay when cut was allowed to be on the ground in some instances for several days before stooking; it consequently became slightly mouldy, and he was of opinion that this was mainly responsible for many sick horses.

Gawler River, October 14.

(Average annual rainfall, 18½ in.)

PRESENT.—Messrs. J. H. Dawkins (chair), A. M. and C. A. Dawkins, J. and B. Hillier, Winckel, Rice, Roediger, A. J. and F. H. Bray (Hon. Sec.).

SALT FOR STOCK.—A paper on this subject was read by Mr. B. Hillier. He said it was acknowledged that if salt was not present in the soil and natural foods, it was necessary to supply some for the needs of the stock. Several diseases in sheep were brought about by a deficiency in the food, generally of salt. Salt should therefore be supplied, with the addition of about 10 per cent. of sulphate of iron. It had been stated that salt aided digestion, especially in old animals, and that a sufficient and regular supply would act as a preventive of impaction or dry bible by promoting the flow of the gastric juices. Stalled cattle and horses should have a lump of rock salt in the feeding box, and those in the paddock should have a supply near their camping places. In the summer he put a shovelful of salt in the water trough about once a fortnight. Cattle thus supplied did not chew bones as they did in the absence of the salt. Worms and other troubles were more easily got rid of by animals which had a plentiful supply of salt. In the discussions which followed Mr. Dawkins said sheep were very fond of salt and ate large quantities if they could get it. Members decided to combine efforts and procure a ton of coarse salt for their use.

Nantawarra, November 16.

(Average annual rainfall, 15 in.)

PRESENT.—Messrs. Sutton (chair), Dall, Dixon, Greenshields, J. and R. Nicholls, Sleep, Smith, Uppill, Gosden (Hon. Sec.), and one visitor.

WORKING FALLOW.—The following paper on this subject was read by Mr. W. J. Dall:—"This is one of the most important works of the farm, and needs careful attention to get the best results. Every farmer must use his judgment and find out the kind of implement most suitable for his land. Sandy soil needs to have the surface left as rough as possible, to prevent drift. It may be worked with harrows in suitable weather to keep the moisture in, but not too often. Heavy land can be treated with heavier working, and left fine on top; but it must not be cultivated too deeply, or the land will not set, and there will be a loose seed bed. Plain land can be worked constantly from 3 in. to 6 in. deep. After ploughing, fallow should be broken down with the harrows—first the same way as ploughed and then across; this will leave the surface in most cases nice and level. If dealing with plain land scarify or work the heavy chisel harrows through it again. These implements are preferable to the cultivator on plain land, as they stir the soil about better, besides being cheaper to work. They also cost less to purchase and for upkeep. A good set of these harrows will work any land that has been ploughed for 1s. 6d. per acre, and a set of four harrows and eight horses can with ease do 20 acres a day. When finished there will be a nice, fine top to well-worked land. Cultivators for plain land are only for loosening the soil, and do not work it as well as harrows, besides costing more to work. Cultivating will cost 2s. an acre, with extra

upkeep of shares, bolts, oil, boxes for wheels, &c., that the harrows do not have, thus leaving 6d. an acre in favor of scarifiers and harrows. Experience has taught me that cultivators bury too many of the top clods. This naturally leaves the land hollow and open, and this treatment of the soil is very injurious. Land must not be loose and open, but worked fine and solid. The beneficial effect of sheep treading fallow land is enough to show that land should be worked evenly on top and at bottom. Some farmers cultivate and draw harrows behind, doing the two operations at once. This, I think, is a mistake. The harrows draw the clods into the hollows left by the cultivator. If a leveller, made of a 2in. pipe filled with sand, is drawn behind the cultivator, this will fill the hollows and make the top level. After this draw the harrows across the work, and so make a good job, from which good results may be expected. The cost of a cultivator is from £22 to £32, against £12 for a set of four scarifier harrows. Common harrows are not kept extensively enough. Farmers should have an extra set, or even two, to use when opportunity offers, such as when a shower of rain comes. If in a busy time, put all hands and teams on and harrow the fallows. This treatment is very important to conserve the moisture, and the cost of common harrows being about 25s. a leaf the interest on the outlay would be very little. The secret of fallow land is to plough it well and work it thoroughly and systematically where it will permit it. Clean fallow looks very nice; but no farmer can clean the land by working it, and I think that mistakes are often made on fallow land by using cultivators to clean off a few weeds, instead of harrowing once or twice and letting the sheep clean the weeds off. If possible, the land should be ploughed early in the year and teams kept on it until harvest time, except where the soil is light and drift, and here care is necessary. For plain land the common harrows and the scarifier harrows are the best implements for working fallow. On stumpy land the same treatment with common harrows, one cultivating and harrowing, afterwards keeping the top stirred, will give a good surface and seed bed. In no case plough fallow back. This system of working, if carried out, will be found to give good results, and if it is necessary to use the roller use it before the harrows." A good general discussion followed. Mr. R. Nicholls also recommended the scarifier harrows, but he was of opinion that the upkeep would cost a good deal, as the tines would need to go to the blacksmith when worn. He did not believe in ploughing back land. Mr. Sleep had found the Triumph cultivator the best implement to clean the fallow. Mr. Jas. Nicholls spoke of the need of harrowing the fallow after every good rain to conserve moisture. If properly set the scarifier harrow would go into any fallow. It was a splendid implement, but rather heavy, and it went very deeply into the softer soil. In reply Mr. Dall admitted that this implement went deeply into soft soil, but added that the cultivator would do the same if carelessly handled. He got the scarifier harrows to work satisfactorily in hard patches by standing upon it. It was a mistake to work up the land to keep weeds down, as they brought fresh seeds to where they could germinate. It would be better in spare time to run the harrows over the land than to cart hay or fill in time in other ways.

BLUE WEED.—Mr. R. Nicholls said he had seen some of this weed in the district. He hoped members would do their best to destroy it. Others had also seen the weed in question growing in the locality.

Northfield, November 8.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Williams (chair), Goldney, Dall, Eastwood, Kelly, Kimber, Nelson, Kemp, Roeger, Mitchell (Hon. Sec.), and one visitor.

FIELD PEAS.—Mr. Kimber read a paper on "The Advantages of Growing Field Peas," to the following effect:—"The value of leguminous plants such as peas as soil enrichers has long been known. The farmers in this district should, in my opinion, grow them much more than they do, as here we have the advantage of living near the city and its markets. It is unusual to see a crop of peas about here, but in the Meadows, Bull's Creek, and Willunga districts fields of from 50 to 100 acres of peas are not uncommon; and each year sees an increase in the area sown. Peas add nitrogen to the soil, which they have taken from the air by means of the nodules to be seen on the roots of the plant. The succeeding crop has the advantage of this store of nitrogen, which is so beneficial. I have seen many illustrations of this fact. I had a strip of peas which grew very rank on manured land, and, as is usual with rank growth, the yield of peas was not large, but I got a fine stack of haulms, which was converted into manure in the pigstyes. The following year I sowed Marshall's No. 3 wheat on the same ground, and one could see within a few inches where the peas had been the previous year. Many were the comments of the neighbors, and it was quite an object lesson. The crop went 40bush, to the acre,

Another advantage is that peas can be sown on land which has been cropped the previous season, and will return an income from land which otherwise would have been bare fallow yielding no return, and requiring a lot of labor to keep it cultivated. The end aimed at by fallowing is attained and a substantial cheque as well. As a green manure for an orchard peas are highly recommended. They should be sown as soon as the first rains come, and then, when flowering, should be rolled and ploughed in, care being taken to completely bury them. This can be done by using a disc couler and drag chain. It is fairly expensive, but has proved very beneficial in many orchards. It is usual to sow 2bush. to the acre, but if the seed could be graded a smaller quantity would do. I have seen very inferior seed offered for sale, and much useless stuff is sown. Cracked, caterpillar-eaten, and very small peas would be better in the pig trough than in the drill. Sow good seed with 1cwt. super. as soon as other tilling is done on land treated as for a wheat crop. Roll the paddock as soon as you can, though sometimes this is not done till the peas are up. The rolling is very necessary if the mowing machine is to be used for harvesting. The peas can be harvested in several ways. A horse rake will gather them fairly well, but of course a lot will be shaken out. These, however, need not be wasted, as sheep can be turned in and will pick them up as clean as pigs would. They are very fattening, and in the South large numbers of sheep and lambs are made very prime in the pea paddocks. The cleanest and best way, when the greater part of the peas are required for seed or sale, is to cut them with a mowing machine, with a Tolton pea harvester attached. This is a very effective contrivance, and can be fixed on a mower in a short time. Movable fingers raise the haulms, however tangled, for the knives to cut. The haulms pass on to six long trailing rods, and are easily rolled off by a lad, and a clear track is left for horses and machine for the next round. No more should be raked or cut than can be carted at once, as they are better uncut than blowing about. Make a round stack with a well-cleaned floor around it. From the stack the haulms can be thrown down all round, and the peas threshed out with a roller. Choose a hot day, and after circling the stack a few times turn the peas and repeat. Throw the threshed haulms well back, leaving an opening for the entrance of horses. The cleaning up depends upon the size of the stack and upon the weather. Carefully stack the haulms, covering with iron or straw, as rain soon goes through and spoils them. They will be very acceptable to the stock in the winter. If the peas are wanted only for pig food, a good plan is to make a wire-netted yard and in it erect a strong stand about 4ft. high, and on this stack the peas, and cut and throw them down as required. This has much to recommend it, as the pigs do not waste the peas. They are kept clean and cool. The haulms can be passed through the stable, and they make the best of manure. The value of peas for fattening is well known, but for sows with litters many other food stuffs are better. The cost of harvesting is considerable, and farmers would no doubt be more inclined to grow peas if a complete harvester could be made to do the work. It is not unusual to get 40bush. per acre, and as the price to-day at Port Adelaide is 1s. 5d. above wheat, it looks as though the trouble would be well repaid." In the discussion which followed the general opinion was that while the cultivation of peas was profitable in the hills, where intense culture was practised, on the plains, excepting in wet seasons, they would do more harm than good, as cropping with peas would not conserve moisture in the ground.

Salisbury, November 1.

PRESENT.—Messrs. Moss (chair), Laurie, Hier, Bagster, J., E. V., and A. J. Harvey, Tate, Frost, Bussenschutt, Whittlesea, McGlashan, Short, Shepherdson, and Jenkins (Hon. Sec.).

MARKETING FRUIT.—The following paper was read by Mr. Laurie:—"In marketing fruit a really good sample is the essential point, and all other considerations are of proportional importance. The market is mainly governed by the quantities that the grower has to handle and the amount of good average quality that can be supplied. The grower of to-day has to contend with abuses that have grown up in the past through producers eking out their supplies by mixing inferior samples to make up quantity. Assuming that we have to deal with fairly large quantities of even samples of fruit, there are several methods of disposing of it. Firstly, the local market, which is at present mainly in the hands of the packers and wholesale dealers; secondly, exporting to inter-State markets; and, lastly, shipping to the best markets beyond the Commonwealth. The local market as represented by the dealers in the East End and New markets is by no means a satisfactory method as the business is now carried on. The growers are without any organisation as to the offering of parcels of fruit, and they have to meet a more or less perfect system

among the packers and buyers, which generally results in the growers getting the worst of the deal. A grower will approach a market buyer with a view to selling a substantial number of cases of fruit. The buyer always finds out how many cases the grower wants to sell, and if soft fruit such as plums, peaches, or apricots are being dealt in, he then knows exactly when such fruits have to be sold, and fixes the price to suit himself. If the grower is not satisfied with the price offered he goes to another buyer. In many instances before he gets to another packer's office the telephone has told all the principal dealers exactly what he has to offer, and what No. 1 buyer has offered, and on that they work the grower down to accept the offer in the majority of cases. To combat this one-sided state of affairs several schemes have been devised, but up to now there has not been a workable plan suggested. For the growers to combine and appoint an agent to sell for them has been suggested, but owing to the scattered position of the growers this plan has not met with any success, mainly owing to the want of any practical organisation among the growers. It must be patent to the most casual observer that in seasons of big yields of fruit there is no margin for more than one, at most, of the middlemen to make a profit and yet leave any profit to the grower. While we had Western Australian markets to help us, the enormous prices obtained on the Kalgoorlie goldfields allowed of a heavy percentage of the consumers' price to be divided between agency, shipping, wharfage, inspection, and other charges, and still left something for the grower; but now that Western Australia is becoming a large producer this source of outlet is gradually being diminished. Broken Hill, once a grand market, is now much reduced by the diminished population and general depression. For the last six or seven years every nurseryman has been sold out of fruit trees early in the season, while our population has not increased in proportion to the extensive increase in planting. It therefore becomes imperative that the growers should turn their attention to other markets to dispose of their produce, and also to seriously consider whether it is better to ship the fruit in its natural state or to begin canning, drying, &c., so that time may not be so essential to prevent the produce from perishing. There seems to be considerable danger in currant-growing—of the production overtaking the consumption in the protected markets of the Commonwealth, and it is not a cheerful outlook if we have to compete in the markets of the world with currants grown with cheap labor and cheaper all round conditions of life. The United Kingdom ought to be able to absorb all our products in certain lines for many years to come, could we but obtain a fair and equitable method of selling in the big centres of population. A great deal has yet to be done in reducing exorbitant freights and monstrous charges in the way of agencies, selling, brokerage, and delivery charges, which make fruit liable to 100 per cent. more charges between the grower and consumer than is the case with wheat, wine, frozen meat, or any other foodstuffs. To successfully break down this ruinous system has given rise to many suggestions, and the State Produce Department has tried to initiate reforms both in the methods of shipping and selling the fruit in the various large towns in the United Kingdom. But the old-established prejudices and combinations of middlemen have up till now prevented any very great measure of success from being attained. It therefore remains for the present fruitgrowers to seriously consider the position. Australia has the fruit in addition to other staple products. The old world has the population, and wants our fruit and other produce. The problem to be solved is—'How can we best deliver our marketable surplus to the consumer so that we both can have an advantage?' Trace a case of oranges or apples from the time the case leaves Port Adelaide till it reaches the consumer. There is hardly a step that does not need vigorous reform. Apart from excessive charges, the first reform needed is the actual handling of the cases. We will assume that the fruit has been most carefully graded and packed and nailed down. I have seen at the Outer Harbor cases of fruit taken from the truck on the wharf and smashed down into the sling till some 30 or 40 cases were piled up. Then the crane on the steamer started lifting. The ropes squeezed some of the cases to bursting point, and what fruit had not been ruined by throwing violently down on the wharf must have been further damaged by squeezing which was sufficient to start the nails out of each end of the cases. When it is known that out of 2,000 cases of apples there were the contents of over a dozen cases loose on the wharf, it can easily be imagined what chance that shipment had of arriving in London in any fit condition for the consumer. The cubic contents of a case of fruit is less than is allowed for a carcass of frozen lamb, but the freight on a case of fruit amounts to 50 per cent. more. The temperature required to keep frozen meat is much lower than is required for fruit, and costs much more to maintain, and yet the charges are again abnormally higher for the fruit. The agency, wharfage, storage, and even selling charges are all higher, and for what reason no one knows. It now means that unless we combine to fight these iniquitous overcharges and get every one of them put on a fair commercial basis, we cannot expect to have any show to reap the benefits of the markets in the United

Kingdom, and these are the markets which we have every right to consider ours, and which we must have sooner or later. In conclusion, it must be evident to all growers of fruit that to go on producing without considering when a certain market is to be found, is only doing half one's work as a producer." General discussion followed, and it was agreed that something ought to be done to do away with the profit of the merchant abroad (not the packer), so that it might revert to the grower.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Bute, November 15.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. A. Cousins (chair), E. Cousins, McArthur, Masters, Buchanan, A. and H. Schroeter, S. and J. Trengrove, Stevens, and McCormack (Hon. Sec.).

[Congress Notes.—The two following subjects, which were introduced at Congress, were discussed by this Branch.]

FARMING WITH SMALL CAPITAL.—Considerable emphasis was laid on the fact that the most valuable asset a man could have when commencing farming was grit and determination. It was considered that a man could successfully start farming on Government lands with a cash capital of £100, provided that he took advantage of the Advances to Settlers Act, and so obtained further money at a low rate of interest.

MOTOR TRACTION ON THE FARM.—Members were of opinion that motor tractors could not be profitably employed on the majority of farms to-day. There was an absence of data as to cost of tractors and working expenses. It was also said that in patches of soil where increased power was needed the power of the tractor decreased owing to the nature of the ground under the wheels.

Minlaton, September 29.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Bennett (chair), Boundy, Martin, Page, Evans, Vanstone, Correll, McKenzie (Hon. Sec.), and one visitor.

CASTRATION OF CALVES.—In reply to a question, it was stated that calves should be castrated as soon after they were born as was convenient, as they soon became staggy if left, and this went against them in the butchers' valuation.

WEIGHT AND FREIGHT OF BAGS OF WHEAT.—Members thought the imposing of an extra rail charge on wheat bags of over 200lbs. weight would be an injustice to farmers and merchants, and they carried a resolution to that effect. They considered the Chapman bag should be used for wheat and barley, and larger bags for lighter material.

EXAMINATION OF STALLIONS.—Considerable discussion took place concerning the Government veterinary examination of stallions, after which it was agreed that this examination was of no benefit to this district.

Pine Forest, November 15.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. Johns (chair), Bayne, Smelt, Goodridge, Schultz, Carman, Nelson, and Barr (Hon. Sec.).

FIRE BREAKS.—The Hon. Secretary read a paper on this subject, which, he felt, was particularly applicable this year, as never before had there been such an abundant growth of grass in paddocks and along the roadsides. In many places it was right up to the top wire of the fence. The question therefore arose as to whether farmers were justified in leaving the fences in this dangerous condition. Apart from the usual few furrows turned just inside the fences, he considered that this unusual season demanded extra precautions being taken. A column of smoke arising suddenly during harvest time would cause all neighbors to leave their work and hurry to battle with the farmer's most

deadly enemy. But some little foresight and action taken now might go far to avoid loss later on. Some of the clauses of the Act for the Prevention of Fire were violated in ordinary seasons, but for the common good in such a year as this everybody should help towards having all these carried out to the letter. Members agreed that it was the bounden duty of everyone to observe the laws relating to the prevention of fire. The prevalence of men who smoked on the harvesters and reapers was deplorable. There was need of combined action by landholders to make public roads safe. They further considered that there was need for additional legislation, making it compulsory for every landholder to plough or otherwise clear a distance of at least 10ft. around his crops and grass paddocks.

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. Carman. Having inspected the garden, crops, stock, and outbuildings, members were entertained to tea by the host and hostess, whose kindness was acknowledged in suitable terms.

WESTERN DISTRICT.

Elbow Hill, November 12.

PRESENT.—Messrs. Cooper (chair), G. and H. Dunn, Williams, J. and E. Wake, Wheeler, Bryant, Tilley, Rehn, Ward Frith, Kerne, G. Wake (Hon. Sec.), and five visitors.

HAY PRODUCTION.—Mr. J. Wake read a paper on this subject to the following effect:—"Land for hay should either be grubbed or have the stumps cut level with the ground. Over 6in. of crop had otherwise to be left because of stumps, &c., and this would mean a loss of quite a quarter of a ton to the acre. When preparing the soil for hay the cultivator should immediately precede the drill and the harrows should follow. If the time could be spared it paid to cross drill a hay crop. He would put in 1 bush. of seed and 70lbs. of super. to the acre, and a month after sowing would roll the ground level to facilitate harvesting. If for chaff the crop should be cut when plump and green—just before turning yellow. If for loose feeding it should be cut just as the flower fell. The hay should be stooked within 24 hours of cutting, and he believed in making the stooks as large as possible. The milk in the grain should be dry before carting was commenced. He found it unsatisfactory to re-stook after heavy rain, as by so doing the hay was damaged. In building the stack the middle should be highest, keeping the butts of the sheaves outwards; but if loading a wagon, the reverse should be the case. The top of the stack should be run up to a peak; and then a load or two of straw put on to this would keep out all the rain experienced in this district. Of all the wheats that might be grown for hay he preferred Gluyas. The chaff was strengthening: the horses did well on it, and required less of it than of lighter kinds. Medeah was a comparatively new wheat to him, but the horses liked it, and if they did as well as they did on Gluyas he would thoroughly recommend it on account of its heavy yielding powers. In two years he found it yielded at least 1 ton per acre more than Gluyas." A good general discussion followed. Mr. G. Dunn did not think that it was always worth while to grub the land for hay, as the nature of the seasons and other causes which affected the crop sometimes made it necessary for a farmer to cut his hay from some other paddock than he had originally intended. Mr. Cooper agreed with practically the whole of the paper, and believed in grubbing the land.

SHEEP v. HORSES.—A discussion took place as to which would pay the best as surplus stock—sheep or horses. After considering the matter the majority considered sheep would give the best immediate return, but some of those present thought that in the long run horses would pay better, as they did not take so much out of the land.

Green Patch.

CORRECTION.—Mr. Whillas, who read a paper on "Motive Power for Farm Work," printed in our last issue, desires that the following correction should be made:—Page 426, line 52, should read, "The brake horsepower divided by the indicated horsepower equals the mechanical efficiency of an engine." Page 427, line 31, should read, "will return about 75 per cent. of the feed water"—not "fuel," as printed.]

Koppio, November 17.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Gardiner (chair), Price, Barrand, G. and M. Howard, Richardson, M. Gardiner, Thompson, and Brennand (Hon. Sec.)

HOMESTEAD MEETING.—Members met at the homestead of the Chairman, and made an inspection of the crops. These presented a very promising appearance. A field of Smart's Early, for hay, looked particularly well, and should yield upwards of one and a half tons per acre. Mr. Gardiner had also been growing peas, and it was evident that the district suited them. The crop was magnificent, some of the runners attaining a length of from 6ft. to 7ft., and being exceedingly well podded. The plot, which was five acres in extent, was estimated to yield from 40bush. to 50bush. per acre. Another crop of the same peas, sown much later, was also much admired, members being quite convinced that it would pay to go in more extensively for this form of crop. The rest of the wheat and oats were very healthy, and all was promising for the harvest. Members were then entertained to tea by Mr. and Mrs. Gardiner, who were heartily thanked for their hospitality.

Merghiny, November 3.

PRESENT.—Messrs. Bubner (chair), Doolan, Moore, Moody, Barnett, Bartlett, Basham, Mulrooney, and Symonds (Hon. Sec.).

HINTS ON HARVESTING.—Members expressed their views concerning some of the aspects of harvesting operations. Mr. Barnett considered it paid to procure up-to-date machinery and take the crop off as speedily as possible when once it was ripe. He would reap hard-stripping wheats early and late, and the easy varieties in the middle of the day. The Chairman thought it unwise to reap until the heads were quite ripe. He would not strip the crop in the excessive heat, but found that starting early in the morning he could drive faster than later on, and could do better work. The harvester should be carefully regulated, especially the fans, and should be driven at a regular pace, and, if possible, should have an even team. If the crop was a little damp, the pace should be slightly increased. It was worse to strike stumps with the off-side wheel than with that on the near side, as a jolt there would often block the sieves. Mr. Bartlett spoke of the advisableness of leaving wheat intended for seed until very ripe. If this were done, and the seed carefully pickled, there was very little chance of bunt proving troublesome.

SEASON'S PROSPECTS.—The Hon. Secretary reports nice rains, which, although they damaged some hay, would probably benefit the late wheats. These latter showed little promise a month ago, but now gave every prospect of yielding well. The crops generally were looking first-class.

Mitchell, November 12.

PRESENT.—Messrs. D. Green (chair), Molloy, McCormack, O. J. and P. Green, Head, Miller, Jericho, Sampson (Acting Sec.), and two visitors.

HORSE-BREEDING.—Mr. Miller spoke on horse-breeding. He strongly advised the selection of strong, pure-bred sires and the best mares obtainable. He was not in favor of the existing arrangements respecting the examination of stallions for hereditary unsoundness. Other members agreed that the purest stock should be obtained for breeding farm horses.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Geranium, October 14.

PRESENT.—Messrs. W. Mitchell (chair), W. J. Mitchell, M. and F. Alford, Long, F. J. and W. D. Hammond, Rudd, Dohnt, and Pannell (Hon. Sec.)

PROBLEMS OF WHEAT-GROWING.—Samples of wheat plants were tabled by Mr. Mitchell to show that abundant stooling was not always a desirable feature. One plant consisted of seven stalks, but only three were bearing good plump heads. The others, from

the view point of grain production, were only robbers of the soil and the developed heads. Another plant from the same plot consisted of three stalks. It looked much better, and each stalk carried a fine, large head, promising to return more wheat than the first plant mentioned. Members remarked on the noticeable superiority of the crop on the north side of sandhills as compared with those facing the south. This was to be seen in almost every instance where the ridges were running east and west. They would be glad if any explanation of this could be offered.

Geranium, November 12.

PRESENT.—Messrs. Mitchell (chair), M. and F. S. Alford, Blatchford, Wendelborne, F. J. and W. P. Hammond, Rudd, Bowden, Gurr, Paige, and Pannell (Hon. Sec.)

GYPSUM FOR LOCAL SOILS.—In view of the analyses of soils published in the September issue of the *Journal* members decided to experiment in applying dressings of gypsum, which they intended to procure from natural deposits near Cooke's Plains.

Murray Bridge, November 14.

PRESENT.—Messrs. Lehmann (chair), Patterson, Kleemann, Stecker, Nelson, Doyle, Taylor, and Davie (Hon. Sec.).

POULTRY-FARMING.—An interesting paper on this subject was read by Mr. Stecker, as follows:—"By a large number of farmers poultry are not regarded as a source of income, but merely as a convenience; consequently poultry houses are exceptions and not the rule. The birds have to roost in sheds, on reapers, &c. If hunted out they find refuge in trees, on pigsties, or straw stacks. They lay wherever they can find a place, and should you be there before the old crow you will get the egg. A large number die yearly from want of care, and diseases claim more than their share. Success in poultry-keeping depends very much upon the nature of the premises the fowls inhabit. They cannot, any more than human beings, retain health and condition without properly-constructed quarters. The perches should be from 12in. to 20in. above ground and about 3in. wide, swinging from the roof or mounted on metal standards. They should be made from wood, so that the birds can grip and not be cold. The nests should be arranged so that the birds cannot sit on the eggs and foul them—preferably on the ground. The floors must be kept clean. A warm winter house means winter eggs; and a cold one means no eggs, sickness, and probably death. Many persons, who have every requisite for success, fail to make poultry profitable because their stock is not adapted to the conditions or the purpose intended. Were all fowls alike in their characteristics this, of course, would not occur, but the very fact that so many breeds have been developed proves the necessity for considering the requirements before the fowls are chosen. An erroneous idea is popular that mongrels or common fowls are better than any pure breeds as birds of utility. There are certain breeds which can always be used to improve the quality of farm poultry; but while some breeds tend to increase the size of the bird and improve the quality of the flesh the egg yield may diminish. Others will improve the laying powers in the progeny, and at the same time decrease their value as table birds. There are certain sorts which can be recommended as all-round farmer's fowls, but a first-class layer and table bird is not the usual combination. For the production of eggs they may be taken in the following order:—Minorcas, Leghorns, Black Spanish, and Hamburgs. Male birds of these strains mated with selected barndoor sorts will produce pullets which will give increased returns from eggs. The progeny of such birds, however, cannot rank as table fowls. In speaking of table poultry I refer to a higher standard than satisfies the average farmer. There is a demand for this table poultry. I suggest a cross between Brahmas and Dorkings. The Dorking and Houdan also make an excellent cross. Of the other kinds the Langshan is hardy, and stamps its character on its progeny, no matter what the cross may be. As layers, Langshans are excellent, especially during winter months, and as table birds they are also very good. Indian Game or Dorking crosses produce a very large, quick-growing bird, which carries a large amount of well-placed white meat and has a white skin. Minorca crosses make a grand all-round fowl—a good layer, and a quick-growing table bird of very fair quality. The Malays are rather long in the legs, but crossed with heavy fowls give good offspring, which are very hardy. I only advocate first crosses, which will give quality; and this is a most important factor. The birds should be plump, shapely, fine in quality, with white flesh and skin; young, and in good condition. The main secret

in breeding for the table is to obtain chickens which mature quickly. Long-legged, slow-growing sorts are neither suitable or profitable. Crosses from an Indian Game, or an Old English Game cock, with Langshans, Plymouth Rocks, and other heavy breeds are excellent in every way. In forcing a fowl for eggs she is made to do what she is not intended to do. Her capacity is limited, and when compelled to go beyond that she breaks down utterly. If you wish to break hens from sitting do not drench them with water or put them in a barrel with an inch or two of water in the bottom nor tie them up by one leg in a tree, but put them in a large coop in the open air (under a shady tree if the weather is warm) and feed them with everything you give to laying hens. In many cases the fowl begins to sit when she is in fit condition to keep on laying eggs. She needs, perhaps, the material for egg shells, which should be supplied. She should not be put in a small coop, where she will sit down and take no exercise. It would be better to put her in a pen with loose earth, so she would have to scratch for a living. A cock may also be introduced to a pen where broody hens are kept. If an owner simply leaves his fowls to chance the results cannot be satisfactory. To be successful in poultry-keeping there are three essentials—proper accommodation, proper selection, and proper feeding. Poultry treated rightly are the most profitable of all live stock." In the discussion which followed members agreed with the main principles laid down. Pure breeds were preferred for laying purposes. It was thought that by selection many other breeds might be brought up to the standard of the White Leghorns. For all-round birds the Silver Wyandottes and Black Orpingtons were preferred, and for table birds suitable crosses with heavy birds.

Parrakie, November 12.

PRESENT.—Messrs. Dayman (chair), Diener, Neindorf, Heinzel, Schmidt, Beelitz Gravestock, Threadgold, Burton (Hon. Sec.), and two visitors.

DISC PLOUGHS.—The question of what style of plough to use in this district was introduced by the Hon. Secretary. On the small mallee country he found the Sunshine twin disc plough the best. It ploughed the soil well, and cut the shoots. He had fallowed 140 acres with one of these implements. Mr. Beelitz preferred the ordinary stump-jump plough, as it cut off a lot of roots and pulled out a number of stumps. Mr. Dayman considered the twin disc best for scrub country. He was able to plough just as deeply as with a stump-jump implement. Mr. Diener preferred the stump-jump plough for ploughing scrub country, but considered the disc implement best for working fallow.

RAINFALL.—It was reported that the rainfall up to date had totalled 18·22in.

Sutherlands, November 12.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Snell (chair), Noack, Mibus, Heusler, Geyer, J. H. and G. Thiele and Twartz (Hon. Sec.).

HAY-MAKING.—This subject was introduced for discussion by Mr. Noack. He thought it best to cut hay when the heads were half filled with grain. If cut earlier than this there was little strength and weight in it. Every farmer should have a binder. Not only did this simplify hay-making, but made it possible to feed each animal according to its requirements with comparative ease. Wheat hay cut at the right time was best, and in this district a choice sample could be grown with plenty of flag on it. In the discussion which followed it was agreed that sheaved hay, when not too long, was better for feeding than loose hay, and the quantity could be better estimated. There was a danger of overfeeding horses with loose hay, with harmful results to the animal and loss to the owner.

WHEN TO STRIP WHEAT.—Some Steinwedel wheat was tabled by Mr. Heusler, who wished to know whether it was advisable to reap wheat when it had turned yellow. Members agreed that if reaped before it was properly ripe there would be a loss of weight and probably trouble from weevils.

WEEVILS.—Members wished to know why weevils were found to breed in wheat which was reaped before it was quite ripe. [The moisture in the wheat and the warmth which results therefrom afford favorable conditions for the development of the eggs of the weevil.—Ed.]

HORSES BLOWN WITH WHEAT.—One of the members wished to know how to treat a horse which had eaten a quantity of wheat. [This information will be found on page

725 of April, 1910, *Journal*. Members should study their *Journals* more carefully and it is advisable that a complete set of these should be kept at the regular place of meeting.—Ed.]

Walkerie, November 15.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Rowe (chair), Lewis, sen., Rogers, Burton, Bruce, Emmett, Jones, and Green (Hon. Sec.).

WHAT TO PRODUCE ON THE MURRAY.—Mr. Pitt's paper on this subject, from page 198, September issue of this journal, was read by the Chairman. Considerable discussion ensued. Most members thought fruit-growing was far from being overdone, and that nectarines, pears, and peaches would still pay to grow. The raisin trouble had been solved for some years to come by the erection of a distillery. There was also a good opening for lucerne and maize growing.

RED RUST.—Mr. Burton reported that he had some Federation wheat which was rotten with rust. Most members agreed that this was not a rust-resistant variety.

Wilkawatt, November 12.

PRESENT.—Messrs. W. J. Bowman (chair), D. F. and D. Bowman, T. C. and T. Sorrell jun., J. W. and G. A. Altus, Brooker, Tylor, Neville, Arhna. Ivett, Schulze, Harvey (Hon. Sec.), and two visitors.

COLT-BREAKING.—A paper on this subject was read by Mr. Schulze, to the following effect:—"A colt should be two years old before being handled for work. The first step is to place him in a strong small yard. Then pass a strong rope along his back with a smooth stick and so over his head. Pass the other end of the rope round a stout post. Now stroke and pat the colt quietly until it is possible to get the winkers on. The harness can all be put on straight away, using a second-hand collar. A 60-ft. rope may now be attached to the near side bit ring, passed under the jaw, and fastened to the other ring to prevent the pit from being pulled through the colt's mouth. After a little air and exercise has been given by running him round, first one way and then the other, he may be unharnessed and let go. On the second day put him on a log with long chains for a while, with one man on each side to keep him steady. When quietened down, he could be put in the body of a six or eight horse wagon team. If no wagon team is working put him on the plough or cultivator, on the off side of the team. Three hours is enough for the first working. If he jibs or is sulky he must be coaxed and taken quietly. Colts that rear must not be pulled at the winkers, but should be driven forward. If he should rear when being led the rope should at once be let loose, and he will come down. Pulling on the rope in such a case as this will make the animal go over on his back. Whatever is wrong a whip should not be used, except as a last resource." In discussing the whole question, members were of opinion that it was better to teach a colt to pull by himself than between two old horses.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, October 18.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Stone (chair), T. and A. Jacobs, Ricks, J. and C. Lewis, Brumby, Mildwater, Broadbent, Hicks, and Curnow (Hon. Sec.).

IRISH BLIGHT AND QUARANTINE RESTRICTIONS.—Mr. C. Ricks introduced this subject. He said that this winter he purchased seed potatoes which had come from Victoria and were guaranteed free from the Irish blight, each bag bearing an inspector's stamp. He planted the seed in his garden in a piece of ground that last year had not borne a crop. Although the plants were only small, he had already discovered blight amongst them. He thought it was a farce to accept the inspector's certificate as a warranty of cleanliness.

He was opposed to the system of quarantine as at present maintained by the Government. He thought that growers in the South should be allowed to send their potatoes to any market in the State. Mr. Ricks was then reminded that only a year ago he had ridiculed the idea of the Irish blight being in the State. The Hon. Secretary said it was hardly fair of Mr. Ricks to state that he planted the seed in land that was free from the blight. Mr. Ricks had last year had the blight very badly in his garden. This year a patch of very forward potatoes belonging to Mr. Colmer only eight or ten chains away from those of Mr. Ricks were quite ruined by the blight. It was hardly fair under the circumstances to condemn the imported seed. Mr. Ricks moved that "We as a Branch should appeal through the Advisory Board against the present system of quarantining the infested districts." As no one seconded the resolution, it lapsed.

IMPROVING THE STRAIN IN BEES.—A paper to the following effect was read by the Hon. Secretary:—"Those who have kept bees for some years know the advantages of introducing new blood into the apiary every few years. Bees, like racehorses, degenerate by inter-breeding, and new blood must be introduced. A pure Italian queen is the best to procure, and will perhaps put most money into the pocket. To ensure getting new blood perhaps it would be as well to procure the queen from one of the other States. A few days before the arrival of the new queen kill the queen in one of the strong colonies and remove all eggs and very young larva. When the new queen arrives, place her in a small cage and swing it between two of the combs. See that she has food for 48 hours. At the end of the second day she may be liberated, and the bees will accept her. When purchasing, I think it wise to buy a fertilised queen, as then her progeny will be pure. It is best to place this colony as far from the general apiary as convenient. So soon as the new queen becomes established and eggs are procurable, a slide should be placed in each of the other hives of the apiary. Before doing this, however, it will be necessary to kill the queen in each hive so treated, and to allow the colony to remain queenless for say about a week. Meantime the bees will have constructed a number of queen cells. These must of course be destroyed, and only the queens raised from the new eggs be allowed to live. Perhaps one slide will produce several new queen cells, and this is so much the better. So soon as these cells are capped over each surplus cell should be removed, and one should be placed in each of the other hives that have been made queenless. Of course all this means care and attention, but in a district where bees are profitable I think it pays to keep only the very best."

Forest Range, November 10.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. F. Green (chair), A. J. E. and R. Green, McLaren, Collins, Pollard, Rowley, Vickers, and Monks (Hon. Sec.).

RASPBERRY CULTIVATION.—A paper on this subject was read by Mr. A. Green. Mr. Green thought there was much room for improvement in raspberry-growing. All would agree that an aspect facing the morning sun and shaded from that of the afternoon was best. He advocated planting the canes from 3ft. 6in. to 4ft. apart with 5ft. between the rows in suitable soil. This would leave room for children to do the picking. He also advised early digging particularly if there were many weeds, and then would follow early with a prong hoe, stirring the soil deeply. Just before picking he would work the top soil to a nice, fine tilth, in order to retard evaporation of moisture as much as possible. Gardeners went to a deal of trouble to conserve the moisture for vegetable crops by working the soil well, but there was no crop grown here which, in his opinion, required more moisture than raspberries. He would apply manure every year to stimulate the growth of the cane and the production of fruit. Late hoeing in dry years did more harm than good. Mr. Green, in criticising the paper, did not agree to dig very early. If the weeds were to be kept down, from July to August was quite early enough to dig, but he would use a hoe before the ground became too hard and dry. Mr. Vickers did not believe in early digging. If digging was done in October the soil, the canes, and the fruit were better, but the digging must be well done. Mr. McLaren agreed with the distance to allow between the canes. He did not believe in digging very early, but would cultivate twice. Mr. R. Green thought the advice regarding the deep prong hoeing was good, and also the three cultivations. Mr. Pollard would not necessarily cultivate three times. If rain set in after hoeing he would hoe again to keep the surface of the soil loose. He preferred to plant 4ft. 6in. square. Mr. Monks thought it almost impossible to cultivate raspberry ground too much, especially in the dry years, when the saving of moisture by thorough cultivation prevented a crop of scorched berries. He would leave at least 5ft. between the plants both ways to allow a free current of air in all directions. Mr. F. Green was

certain that raspberries would pay much better if better methods of cultivation were adopted. A greater distance was necessary between the plants, and the canes should be manured well every year. He would give each one not less than a good handful of bonedust.

Hartley, November 1.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Wunderaitz (chair), Brook, Phillips, Paech, Pratt, Hudd, Symonds, Stanton, Clark, and Bermingham (Hon. Sec.).

HOMESTEAD MEETING.—Members met at the residence of the Hon. Secretary in the morning, and then drove round and inspected the crops on their respective holdings. Any fallow which was to be seen was looking remarkably well, but the other crops were rather poor. Most of them were badly affected with takeall. A crop of Huguenot on fallow land at the Chairman's farm, at which a stay was made, was much admired. It was nearly 6ft. high, and should grow still higher, as it was quite green. A paddock of Yandilla King was also a lovely crop. Both of these were on fallow land. The homestead and outbuildings were kept in a very creditable condition. A large iron shed, open on the east side, contained about 30 tons of last season's hay. An oil engine used for cutting chaff and crushing corn was inspected, and members were unanimous in the opinion that this was quite an up-to-date farm. Tea and supper were partaken of, and the meeting then terminated, members having had a most instructive and enjoyable time. The Chairman was thanked for his hospitality.

Kingscote, November 11.

(Average annual rainfall, 18½in.)

PRESENT.—Messrs. Turner (chair), Wright, Castine, Murray, Evans, Chirgwin. Barrett, Wallace, Cook (Hon. Sec.), and four visitors.

HOMESTEAD MEETING.—This meeting was held at the homestead of the Chairman. In the morning members inspected the sheep dip, the grass paddocks, and several weighty rams therein. A good crop of Duckbill barley was estimated to return up to 60bush. per acre. Jacobs No. 7 wheat, standing 4ft. 6in. high, showed the effects of excessive moisture in places. Some plots of Indian Runner and Baroota Wonder wheat looked well. A paddock of potato onions was in splendid condition, as also were shallots, garlic, broad beans, and peas. After lunch the party inspected a crop of Prior barley. Although sown at the end of August it had made wonderful growth and was just coming into ear. The probable yield was thought to be up to 40bush. Considerable interest was displayed in the grass plots, especially that of *Phalaris commutata*. This had been cut down level in July and was now over 3ft. high.

EXHIBITS.—The following exhibits were tabled by various members:—Cape barley, King's Early, and Federation wheat, and rye, sown on ironstone country; also Marram grass, Algerian oats, Chou Mouller kale, and several samples of wheat and barley. Some fine Nickajack apples, grown at Cygnet River and picked in March last, were tabled. They were in good condition. Mr. Kubash said he had seen no better crops in the district than those on the ironstone country of the south coast.

MORE MEMBERS WANTED.—It was agreed that the work of the Branch was sufficiently important to warrant more support and enthusiasm on the part of the Island residents.

Having transacted the business of the Branch and having spent a profitable day, members thanked their host, and the meeting terminated.

Longwood, October 22.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes (chair), W. and J. Nicholls, Glyde, Oinn, Roebuck, Vogel, Pritchard, Furniss, Coles (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. Coles. An inspection was made of the premises, and, having studied the effect of pruning in the orchard, members were more than ever convinced of the advisableness of pruning very lightly until the fruiting habit had been established. It was also observed that replacing trees in old orchards such as this was very seldom, if ever, practicable. The young trees

could not hold their own against those which had been established for years. It was considered that the trees in this orchard were suffering from the growth of grass underneath them. Refreshments were kindly provided by Mrs. Coles, and the business part of the meeting was then transacted.

ARSENATE OF LEAD AND DANGER TO STOCK.—Members wished to know whether it would be safe to feed hay or grass to stock cut from round about trees which had been three times sprayed with arsenate of lead. [For this information see page 659 of the March, 1909, issue of the *Journal*.—Ed.]

HARES DAMAGING TREES.—Mr. Furniss reported that he had solved this difficulty by painting the trunks of the trees with arsenate of lead, using the poison at about the consistency of ordinary paint.

EXHIBITS.—Some English Meadow Foxtail grass, 3ft. 9in. high was tabled. It was said to grow luxuriantly in rich, damp soil. Also two samples of cider; one of good quality, and the other, from a well-corked earthenware jar, a poor sample.

BACON-CURING.—A member wished to know what mixture to use for curing about 100lbs. bacon. [The Dairy Expert recommends a mixture made up in the following proportions:—10lbs. of salt, 2lbs. of sugar, 2ozs. of saltpetre. During warm weather 2ozs. of boracic acid may also be used, and I would also recommend using, say, 1lb. of sugar instead of 2lbs. The mixture should be carefully rubbed in each day for nine days. Then every second day is sufficient to rub and turn it for the following eight days; in all 17 days from commencement.—Ed.]

Meadows, November 14.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. Ellis (chair), Brooks, Nicolle, Morris, Kleemann, Griggs, and Bertram (Hon. Sec.).

ECONOMICS OF FRUIT-GROWING.—Mr. Griggs read a paper to the following effect:—“Land must be well drained if it is to grow good fruit. Judicious manuring will improve both the size and the color of the fruit. Pruning should be done in such a way as to admit the light and air, leaving enough to shade the fruit-bearing branches. It paid to find out what fruits did well in each orchard, and when the kind had been discovered to get to work grafting and budding. Grafting different kinds on one tree revealed which did best. The paper continued—“I saw recently a wild cherry grafted on to another cherry that would be loaded with blossom, but would bear no fruit. The result of the graft was that the wild cherry fertilised the other. I have grafted other kinds of pears on to the Winter Nelis, as a test, and have also grafted many kinds on to some old Winsor pear trees. The change caused an improvement in the fruit. Land must be properly worked, to let the air in. The roots of the trees want air as well as the branches. Growers must use their brains to save their hands, and to see that nothing is wasted. Fruit that falls or gets damaged by pests can be cut up and dried. It will then keep until the fresh is gone. I fixed up a little drying place, so that fruit can be dried in four hours without the aid of the sun. I have sold about £14 worth of dried fruit this season, most of which would have been wasted had it not been dried. The cores and peel went to the cows. I believe a case of ripe apples will produce 1lb. of butter. The last two seasons, in the month of March, our cows brought in on the average over £1 each, and they had waste apples to eat while being milked.”

LUCERNE FLEA.—Mr. W. Nicolle reported that the lucerne flea was doing a lot of damage at Dashwood Gully this year, having eaten off a whole patch of lucerne.

IRISH BLIGHT.—Mr. J. Morris reported that he had planted some seed potatoes imported from Victoria. Although the potatoes appeared to be quite sound and healthy when planted, the tops showed the Irish blight when they came up.

Mount Pleasant, November 11.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Giles (chair), Thomson, Phillis, P. and J. Miller, Tapscott, and Vigar (Acting Sec.).

MANURES.—A paper on “Manure and Manuring,” written by Mr. Adams, was read by the Chairman. It ran somewhat as follows:—The term “manure” implies such a lot to the agriculturist that it will be impossible for me in this paper to go fully into the subject. The use of manures has revolutionised farming in this and other States,

and the growing of wheat or other grain has now become a science. Although the use of phosphates has increased the yield of the crops and considerably improved the financial position of the agriculturists and the State as a whole, it is surprising how many farmers are ignorant of the chemical effect the super., or whatever manure they use, the application of which to the soil produces such marvellous results from land at one time considered useless as far as wheat-growing was concerned, or land that had been "worked out." Then again, the question as to what sort of manure to use is one that often worries the farmer who may have land of a calcareous nature, and is doubtful as to the result of his applying, say, basic slag, superphosphate, or nitrate of soda. The average farmer knows little of chemistry, and even if he has his soil analysed the result may not be satisfactory in practice, as a soil rich in phosphates to the chemist may to the farmer be very poor. Farmyard manure is an example of general manure. I shall deal only with artificial or commercial manures in this paper. These are classed into three groups—(1) phosphatic, (2) nitrogenous, (3) potassic. Under phosphatic manures we have bonedust, superphosphate, basic slag (or Thomas phosphate), guano, and bone char. It was by the use of phosphates that the yields of wheat and hay have become so heavy. South Australian soils are low in phosphoric acid. In most countries with a heavy rainfall the nitrates are the most readily exhausted, especially in hilly parts, or where there is underground drainage, as the nitrates are the most soluble of all plant foods. Heavy precipitation and drainage is the reason why phosphates do not give the same result here in Mount Pleasant and similar districts, as they do where the use of phosphate is general, and where the average rainfall is anything from 10in. to 18in. The sources of losses of phosphoric acid from the soil are (1) drainage, (2) cropping, (3) grazing. The loss by drainage is very small. The chief loss is continual cropping. A 20-bush crop will remove 19-2lbs. of phosphoric acid from the soil. Grazing the land also removes a good deal of phosphoric acid. The skeleton of a bullock weighs about 100lbs. to 110lbs., and nearly a quarter of it is phosphate of lime. The question is asked, "Why is it that virgin soil does not grow the crops that virgin land did 40 years ago?" The reason is that the land by grazing through a period of 40 years has become deficient in phosphoric acid, the loss in phosphoric acid going in milk, wool, beef, and mutton. For land that was deficient in nitrogen, especially if the country had a very heavy rainfall, bonedust would be the most suitable manure to use. The phosphate in the bonedust is not so soluble, and is not so likely to be washed away as the soluble phosphate in super. The after effects are better with bonedust than superphosphate. On limestone soils superphosphate is the best form of phosphate to use. For mallee land there is nothing better than superphosphate, but in heavy lands, especially if the rainfall is heavy, bonedust is better. Nitrate of soda should never be mixed with superphosphate, because it reacts with the acids in the superphosphate. Nitrate of soda is a stimulant, and it forces the crops rapidly. If it is intended to allow the crop to mature to grain one must be very careful in the use of nitrogenous manures, because crops so manured are liable to grow rank and blight off. Sulphate of ammonia dissolves very readily, and in wet districts it is not advisable to apply it in winter. Ammonium sulphate should never be mixed with lime or basic slag, as these contain lime. Soil rich in lime should be dressed with organic nitrogen, as farmyard manure, or green manuring if it is thought that they require nitrogen. The quantities of ammonium sulphate or nitrate of soda to use varies from $\frac{1}{2}$ cwt. to $\frac{3}{4}$ cwt. per acre. Most of our soils contain sufficient potassium to give the best of crops. Whether the soil requires potash can only be found out by experiments. The soils most likely to be benefited by the use of potash manure are light sandy or gravel soils. Cropping does not exhaust the soil of potash like it does phosphoric acid, as the grain of wheat, oats, &c., contains far less potash than phosphoric acid. To produce the best of crops the plant must have sufficient of the three elements—phosphorus, nitrogen, and potassium. Our soils, as I have pointed out, are deficient in phosphorus. Continued cropping and grazing has further lessened the supply of phosphorus, which we have supplied artificially in the form of phosphatic manures. So long as farmers have the guarantee as to the genuineness of the particular brand of phosphatic fertiliser he need not worry himself as to which is the best to apply; but remember that for light soils or mallee country, and in the drier districts, he should apply the most soluble form, such as any of the superphosphates, while in the heavier lands and wetter districts bonedust or basic slag would be better. Of course, it is as well to note whether the physical properties of the manure are right as well as the chemical properties. It should be dry, well ground, and easy running. The use of nitrates I would recommend in districts such as this, applied as a top dressing about the end of September, to prevent leaching of these soluble manures. The best nitrogenous manure, in my opinion, being ammonium sulphate. Our soils are fairly rich in potash, and the application of potash has not yet proved beneficial. In conclusion, I would advise farmers

conducting experiments with manures, particularly with nitrogenous and potash manures, to continue the experiment over a series of seasons, as a one-season trial is no test at all and not worth the trouble. Unforeseen circumstances may happen, and a good manure be condemned as useless. The use of phosphates through a period of 10 to 15 years has been the means of growing heavier crops, and at the same time has necessarily taken out of the soil larger quantities of nitrogen and potassium, and I feel sure that the time is not far distant when farmers will have to use these manures in conjunction with phosphates if they wish to continue growing the crops they have grown in the past with the aid of phosphates alone. The paper also gave the composition of several fertilisers, as well as the sources from which they were obtained. In the discussion which followed, Mr. Thomson thought grazing rather improved the soil than otherwise. Mr. Miller also held this opinion. Mr. Giles thought the rainfall in this district was too heavy to get the best results from superphosphates. He had sowed 10 acres of crop in September this year with super. after the winter rains had ended. Mr. R. Miller conducted some experiments with phosphates and lime. The phosphates gave very much better results, and on the flats the feed was very much improved.

BLUE WEED.—Mr. Thomson drew attention to the blue weed, and desired the opinion of the meeting as to whether it should be classes as "noxious." Mr. P. Miller did not think stock would eat it, and in this opinion he was supported by Messrs. J. Miller and Tapscott.

WATER CONSERVATION.—Mr. Giles introduced the question of water conservation. Stock tramped into open dams and spoiled the water with filth. He advocated a trough fitted with a ball-cock, to keep the water pure and wholesome.

SEASONABLE REPORTS.—It was reported that the wheat suffered from the very wet winter, but that stock were in splendid condition. The rainfall for October was 4.34in., and for the year up to date 29.22in.

Uraidla and Summertown, November 11.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. Collins (chair), Day, Rowe, Hawke, Willmore, Hart, Cobbedick, Prentice, Curtis, G. F. and H. F. Johnson, and Snell (Hon. Sec.).

MANURE FOR ONIONS.—Mr. Cobbedick wished to know what manure was best for onions, and what would check thrip. Mr. Curtis said that if thrip appeared the soil should be well worked and bone super. put in the drills between the rows. Mr. Hart advised the application of cow manure soaked for some days and then sprinkled on the plants. Mr. Cobbedick wished to know from the department whether spraying would be any advantage and whether the application of sulphate of ammonia would cause the development of top rather than increasing the size of the onion. [It is not possible to give a definite answer to this question. Nitrogen is undoubtedly beneficial to onions, but any considerable excess over requirements would most probably bring about the result mentioned. Only actual experience will, however, indicate what amount of nitrogen can be profitably added, as this must depend upon the soil and upon the nature of the crops previously grown and the manures applied.—ED.]

FRUIT-PULPING PLANT.—Some discussion on this question took place, and the following resolution was passed:—"That this Branch, consisting largely of fruitgrowers, gives its strongest support to the proposal that the Government be asked to erect a pulping plant."

Willunga, October 15.

(Average annual rainfall, 25½in.)

PRESENT.—Messrs. Pengilly (chair), Blacker, Bigg, Burton, Waye, and Hughes (Hon. Sec.).

HOMESTEAD MEETING.—This meeting was held at the homestead of the Chairman. The visitors inspected the green feed experimental plots, each two acres in extent. Cape barley had provided the earliest feed, but indications pointed to the rape giving the greatest bulk. Other plots were rye alone, and rye and rape mixed. To date the plots had carried at the rate of five sheep per acre per year, and there would be another feeding to come. The wheat plots and other cultivated paddocks were also inspected. White Tuscan wheat was ahead of all the others. Other varieties were Silver King, Yandilla King, Gallant, Baroota Wonder, Le Huguenot, Triumph, Bluey. The feed on last year's stubble was exceptionally good, especially on the strips which had carried peas instead of wheat. The pea crop promised a heavy yield.

Willunga, November 5.

(Average annual rainfall, 25½ in.)

PRESENT.—Messrs. Pengilly (chair), Blacker, Bigg, Burton, and Hughes (Hon. Sec.).

SHOTHOLE FUNGUS IN ALMOND TREES.—The Hon. Secretary reported that some of the almond trees in this district were attacked by shothole fungus. Having inspected samples, the Horticultural Instructor had identified the disease as one common to almond, apricot, and peach trees, and had said that it could be checked by spraying with Bordeaux mixture just when the blossoms had fallen.

IMPROVEMENT OF WHEAT BY SELECTION OF SEED.—Having discussed a suggestion made by the Acting Secretary to the Minister of Agriculture (Mr. W. L. Summers) that prizes should be offered to stimulate this class of work, it was decided to support the proposal, and to recommend the local Agricultural Society to take the matter up. The sum of one guinea was voted as a second prize, provided the society mentioned agreed to co-operate.

EARLY LAYING PULLETS.—The Chairman reported that some pullets which he had hatched by means of an incubator in June had commenced to lay within four and a half months. Some were pure White Leghorns, and others Black Orpington x Leghorn.

SOUTH-EAST DISTRICT.**Kingston, October 29.**

(Average annual rainfall, 24 in.)

PRESENT.—Messrs. Jackson (chair), Wight, Lloyd, Nosworthy, England, Clarke, Redman, and Barnett (Hon. Sec.).

HORSE COMPLAINTS.—In reply to a question, Mr. Clarke advised the use of eucalyptus in a hot bran mash put in a nosebag and the latter well fitted on to the animal so that it thoroughly inhaled the eucalyptus. Mr. Wight reported that two horses which had been doing very poorly had already improved since a veterinary surgeon had attended to their teeth a couple of weeks before. The cost was only 6s. per horse, and he considered the money well spent.

MANURING SANDY SOILS.—Discussion took place concerning the best manures for the sandy soil in the vicinity of Mount Benson. Mr. Lloyd thought peas could with advantage be grown and ploughed in to form humus. Peas rolled in super. and then sown with what little of the fertiliser adhered would grow much better than if not manured at all. Rape, he also recommended as a good crop to precede wheat for hay. He would put the rape in in August. Other members thought August was too early to sow rape, and it was said to be too uncertain a crop in this district. Mr. Wight thought peas would not pay in this class of soil. [King Island melilot, or, as it is known in the South-East, Californian lucerne, has worked wonders in improving the poor sandy soils of King Island. Seed could probably be purchased cheaply in the waste from the steam threshers in the South-East. Lupins might also be tried on this land.—Ed.]

SUMMER FEED FOR SANDY COUNTRY.—Mr. Nosworthy thought the primrose was the best summer feed on the sandy soils. In most places it kept growing all the summer. Mr. Jackson had been unable to grow the primrose, but had had great success with lucerne, sown with the crop. It would not stand being eaten right down by sheep, however. Mr. Wight had found black prairie grass the best grower in his paddocks since he had put wire netting on the fences.

RABBIT DESTRUCTION.—Mr. Jackson said it was a mistake to have paddocks of very large area. Even though they were netted, it took too long to get the rabbits out. In about 12 months he had killed 800 rabbits in a 100-acre paddock. Mr. Wight believed in trapping in winter and filling up the burrows. The spring grass was then saved. If a man waited to poison, he had first to lose the grass. Many new grasses had appeared since the rabbits had been cleared out of his paddocks.

Millicent, November 8.

*(Average annual rainfall, 28½ in.)

PRESENT.—Messrs. Holzgrefe (chair), Harris, Major, Stewart, Serle, Mullins, Mutton, Oberlander, Hart, Day, and Thompson (Hon. Sec.).

WATERING HEATED STOCK.—Having inspected a number of veterinary appliances and instruments from Mr. Serle's outfit, members discussed the question of watering stock when in a heated condition. Considerable difference of opinion existed. Mr. Serle considered it was dangerous to give cold water to over-heated animals, and there was a consensus of opinion that much depended upon the temperature of the animal when allowed to drink.

PROGRESS IN FARMING.—Mr. Holzgrefe spoke of some of the differences in farming 50 years ago and to-day. His account of the early days of the South-East district showed that the men and women of those days were not lacking in grit and ingenuity. The coming of various farm labor-saving devices was interestingly recounted.

Mount Gambler, November 12.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Sassanowsky (chair), Mitchell, Watson, Dow, Bodey, Botterill, Pritchard, Major, Kennedy, Smith, Wedd, Sutton, Innes, Kilsby, and Collins (Hon. Sec.).

SHOW JUDGING.—An article on single, dual, and plural judging of sheep, &c., was read by Mr. Sutton from the *Pastoralists' Review*. Extracts are given here:—The writer, after 30 years' experience, held that an alteration in the system of judging had become imperative. Whilst some show committees endeavored to raise the standard of exhibits there were others that looked on the show's success mostly from a financial standpoint. The overlooking of the great educational features of a show by a majority of the societies was greatly to be regretted. Mr. Sutton had had a little experience himself in that way. There were some exhibits of sheep he did not think worthy of a prize. He mentioned the matter to a steward, who said, "Do not disqualify them. The owner of these sheep is the best exhibitor we have at the show." In the single judge system the judge was able to concentrate his whole attention on the animals in each class, and an experienced man would have no difficulty in placing his awards. In the dual system one judge might be quicker in deciding the merits of each animal than the other, and he had thus to wait and might possibly lose some of the impressions he had formed of the animal. Or the other judge might not agree with him as to the best sheep, and when a referee was called in the decision, whether for or against him, became single judging. The same remarks applied to cases where three judges were employed. In the majority of instances the third man decided, and it was single judging again. Another argument in favor of single judging was that it took less time than the other systems. The educational features of judging could be made more pronounced if all the societies adopted the system of "open judging." It was tried at Longreach and Brisbane some years ago, where the judge explained to the exhibitors around him the good and bad points of the animals; but it was discontinued because the losers objected. Another method was that adopted by the late Mr. R. T. Keys, of New South Wales. He had a number of cards printed on which the sheep and cattle judges were asked to state their reasons why the first prize animal was better than the second. It gave great satisfaction, but was not persevered with for the same reason as at Brisbane. Referring to the third reason, Mr. Sutton said that every judge should be able to give a reason for awarding a sheep a prize. By this means an exhibitor would be able to remedy any defects in his flock, and not work in the dark, as under the present conditions. Mr. A. J. Wedd said that a single judge might miss some of the points to be considered, therefore, he thought two judges for sheep were better than one. Mr. J. Botterill was strongly in favor of the single judge system. In every case in which they had plural judges it resolved itself into the single judge system after all. Two excellent judges might be acting together, but one was in favor of one type of sheep and one of another. Mr. Kilsby had judged alone and with others, and preferred the plural system. By that system no points in a sheep were overlooked. Further opinions were expressed, and it was pointed out that the value of shows would be greatly increased if exhibitors could learn from able and impartial judges what the defects were in the stock entered.

Naracoorte, November 12.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Coe (chair), Bray, Loller, Munro, Langeludecke, jun., Caldwell, Rogers, and Schinkel (Hon. Sec.).

SHEEP-DIPPING.—Discussion took place upon the necessity for seeing that all sheep were dipped after shearing. It was stated that there were many dirty sheep in the district, and that they infected those which had been dipped and were clean. A number of the small sheepowners did not dip their sheep periodically, and the number of dips was limited. It could be easily ascertained who dipped sheep if owners of dips in the district kept a record of the sheep dipped. It was also pointed out that the dealings in sheep were much larger than they were a few years ago, and it made the inspection much more difficult. Some system should be adopted to assist the district inspector in checking the sheep which were dipped. It was also pointed out that every sheepowner had, under the Stock Diseases Act, to give notice to the inspector when they dipped their sheep, and that failing to do this they were liable to prosecution. It was resolved to forward the following resolution to the Commissioner of Crown Lands:—"That in view of the numerous complaints about tick and other vermin in sheep, and as there were only a few dips in the district, owners of dips should be called upon to forward a return to the district inspector of the names of those who used their respective dips, and with the number of sheep dipped; such returns to be forwarded on or before the 1st of February in each year."

Penola, November 15.

(Average annual rainfall, 26½in.)

PRESENT.—Messrs. Peake (chair), Fullerton, McBain, Darwent, McDonald, Miller, McKay, Ricketts, Ockley, Williams, Stapleton, Maxwell, Richardson, Adamson (Hon. Sec.), and three visitors.

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. Jas. Alexander. The visitors went through the orchard and vineyard and found everything in splendid condition. The apricot trees were much admired on account of their symmetrical appearance. Each year a portion of the orchard was sown with field peas, and these were ploughed under as green manure. The improvement, Mr. Alexander said, was always very noticeable. Ten acres of Shiraz vines gave promise of heavy returns. These were treated with guano super. every year at the rate of 1cwt. per acre, and the increase in yield had been considerable. Two years ago the crop averaged 7 tons to the acre, and this was a record for the district. Two paddocks of peas, sown at the rate of 2bush. seed and 1cwt. guano super. per acre gave promise of a yield of about 40bush. per acre. A grass paddock had been sown this year with *Trifolium subterraneum* and was doing well. There was also a splendid crop of barley and vetches. The vetches had been cut when 4ft. high, and had since grown another 2ft. In the packing house, which was constructed with concrete and roofed with thatch, were seen some fine Lisbon lemons. Afternoon tea was then partaken of in the garden, rich with roses and other blooms, and the host and hostess were suitably thanked for their hospitality. This closed a profitable and enjoyable outing.

Tatiara, November 12.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. Wilson (chair), O'Shea, Duncan, A. and L. Fisher, Milne, Campbell, Reschke, Staude, Langley, and Truman (Hon. Sec.).

FIRE CAUSED BY DISC PLOUGH.—Mr. Duncan read the following clipping:—"The focussing power of discs on a plough or drill should be widely known. A farmer in Kerang (Vic.) district had thrown a horse rug made from cornsacks on the plough, the discs of which were brightly polished by use. In the heat of the day the rug was found to be on fire, the cause of which was not then apparent. It was extinguished and the rug again placed on the plough. Later the rug was again burning. Tests were made, when it was found that the concave side of the disc acted like a burning glass and readily ignited any inflammable material. The above experience shows that the usual practice of farmers and others in allowing their ploughs, after use, to be pulled on to grass land is a dangerous one, and may easily be the start of a serious grass fire."

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All communications to be addressed:

“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Government Seed Wheats.

Particulars will be found in the advertising pages of this issue of the seed wheats and barleys to be obtained this year from Parafield and Roseworthy Agricultural College. So far as Parafield wheats are concerned, orders will be received up to January 31st for the varieties mentioned, a description of which appeared in the December issue of the *Journal*. Last year there was a heavy demand for selected Federation and Comeback, and in anticipation of similar demands this year large quantities of both these varieties were sown. It is hardly necessary to impress on farmers the importance of obtaining hand-selected and graded wheats for seed purposes.

The Scottish Agricultural Commission.

So much importance has been attached to the reports of the Scottish Agricultural Commission to Denmark, Ireland, and Canada that it is a matter for congratulation that 12 members of the Commission accepted the invitation of the Federal Government to report upon the system of agriculture in Australia. In pursuance of the arrangement with the Federal Government, the following gentlemen spent the greater portion of December in all parts of South Australia :—Sir T. Carlaw Martin (chairman), Sir John G. Sinclair (deputy chairman), Messrs. A. M. Prain (hon. sec.), W. Barber, M.A., J. McHutchen Dobbie, Jas. Dunlop, R. Shirra Gibb, R. B. Greig, F.R.S. (Edin.), W. Henderson, James Keith, E. E. Morrison, M.A., J. H. Wilson, D.Sc. and F.R.S. (Edin.). All of the members have been prominently connected with agriculture in Scotland, and they are looked upon as authorities in the different departments of agricultural work that they have taken up. The main subjects of their study while in Australia were land settlement, the constitution and operations of the Ministry of Agriculture, agricultural education and research, experimental farms, live stock, mixed farming, wheat farming, dairying, sheep farming, fruit and vegetable farming, poultry farming, agricultural co-operation, cold storage, and markets. While in South Australia the members of the Commission were afforded every assistance in prosecuting their inquiries by the Government, particularly by the Minister of Agriculture and the officers of the department, and of the Tourist Bureau. As their report follows similar investigations in Denmark and Canada it will have special value, and the references to South Australia, which was one of the last States visited, will be eagerly awaited. The appointment of the Commission originated with Captain Sinclair, member for Forfarshire, who is

now Lord Pentland, Secretary for Scotland. He conceived the idea of sending a number of representative farmers of Forfarshire to Denmark to study Danish methods of agriculture, and so improve the industry in Scotland. Instead, however, of limiting it to Forfarshire the Commission was made representative of the whole of Scotland. It visited Denmark in 1904, Ireland in 1906, and Canada, at the invitation of the Dominion Government, in 1908. Twenty-two members of the Commission visited Canada, but only 12 were able to come to Australia. The report of the Commission will be presented to the Federal Government.

Farmers' Sons at Roseworthy College.

The Acting Principal of the Roseworthy Agricultural College in his annual report repeats the complaint made in the Principal's report for 1909-10, namely, that farmers do not, so far as the education of their sons is concerned, avail themselves of the advantages afforded by the College. He has prepared a table showing that 80 per cent. of the students come either from the city or from rural homes that have no direct connection with the land, and he goes on to say—"No more striking evidence could be given of the indifference of South Australian farmers to the benefits to be conferred on young men destined to take up rural pursuits by a systematic training in agriculture and the associated sciences. We again find that the adjoining States send more students to Roseworthy than the whole community of South Australian farmers. Only 10 out of the 49 students on the College roll this year claim parentage amongst those who constitute the agricultural community. No less than six other branches of the community are represented on the College roll in greater numbers than the South Australian farmers. Surely it is idle for our farmers to philosophically lament the absence of educational advantages in the days of their youth and yet at the same time allow their sons to ignore the opportunities offering at this institution to-day."

The Agricultural Bureau.

Mr. J. W. Sandford (the Chairman of the Advisory Board) in his annual report to the Minister of Agriculture refers as follows to the work of the Agricultural Bureau:—"Generally it may be said that the Branches of the Agricultural Bureau have shown a fair degree of activity during the year, though in quite a number of cases the apathy of the members and failure to appreciate the value of exchange of experiences is very apparent. Fifteen new Branches have been established, and six closed owing to lack of support; the number in operation on June 30th was 122. The number of reports received totalled 778—a somewhat lower figure than the previous year.

The removal of the limit as to number of members allowed to each Branch has, on the whole, been justified, but in a good many cases it has simply resulted in a large number of names of non-attending members being left on the rolls. During June the rule that one-third of the members retire—i.e., those with the lowest attendance—has been enforced and the rolls generally purged."

South Australian Currants.

Early in the year Professor Perkins, after visiting Greece, suggested that the Department of Agriculture should forward to the British Ambassador at Athens and the Consul at Patras samples of South Australian currants. The Professor mentioned in his letter that those connected with the trade in Greece were sceptical about South Australia producing currants of any quality. Under the instructions of the Hon. the Minister of Agriculture two 10-lb. boxes of first-grade currants were sent through the Trade Commissioner in London, who has now received the following letter from the British Consul:—"Through His Majesty's Legation at Athens I have this day received a case containing currants produced in South Australia, and beg to thank you for this act of courtesy. I have examined these currants carefully, and, being in the trade myself, I am able to give you the following appreciation of their quality. In size they are somewhat smaller than the usual run of currants produced in Greece, but this in no way reduces their market value, as small-berried currants are in good request nowadays. In color they have not the dark-blue purple hue which characterises the best Greek produce. Still, they are superior in this respect to the ordinary run of currants grown in this country; but the taste and aroma are not quite so pronounced as in the finer lots of Greek fruit, but this may be due to the fruit being last year's crop. The packing, evenness in size of berry, and cleaning is perfect, and superior to what is done in this respect by shippers from this country."

Government Tractors for Transport Purposes in Natal.

Official notification has been issued that the Government is importing several tractors for the purpose of undertaking transport for farmers and others in this province in those districts in which large quantities of produce, etc., require removal, and in which the roads and other conditions are suitable for the use of tractors. The rates to be charged for such transport have not yet been decided upon, but these will be as low as possible, the object being to assist the producer and to fix rates sufficient merely to cover costs of maintenance. Persons having large quantities of produce, &c., requiring to be transported are requested to send full particulars to the Director of

Transport, stating the distance in miles from the station, the condition of roads and country, whether labor is available for loading and off-loading, the date such transport is required, and giving all possible information. Applicants will be advised in due course whether their work can be taken in hand and the rate to be charged for same.—*Natal Journal*.

A Large Cheese Factory.

New Zealand claims to possess the cheese factory receiving the largest supply of milk of any cheese factory in the world. This is the Riverdale Cheese Factory, situated in South Taranaki, which, during the first year's operations handled 2,750,000lbs. of milk, while last year it treated 16,831,881lbs. The daily supply in the season ranges from 9,500galls. to 10,000galls. There are 49 suppliers to the factory milking over 3,200 cows, and 27 of the largest suppliers use milking machines. An interesting statement in connection with the factory is the production of butter fat per acre per annum. Last year 619,016lbs. of fat came to the factory from 6,854 acres, giving an average production of 93.36lbs. of fat per annum. The best return was 177lbs. Twenty suppliers exceeded 100lbs., and the lowest got only 53lbs. of butter fat per acre. The first man is getting more than three times the return per acre of the lowest, yet it is stated that if the two farms were put up for sale they would realise about the same price per acre. Nine pounds per acre from milk alone is a big return, and indicates that the farm is in possession of a high-class dairy-farmer.

Wheat-growing with Limited Rainfall.

In an introductory note to the official report of a recent Conference of Wheatgrowers, issued by the New South Wales Department of Agriculture, the following statement appears :—"It is estimated that within the limits of 20in. rainfall there are in New South Wales 20,000,000 acres of land. This has hitherto been regarded as the 'safe' wheat area, but South Australian farmers assert that 16in. are entirely satisfactory to them as wheatgrowers *provided they fall during the right months*." Such a view might have been held in South Australia 20 years ago, but for a number of years a great proportion of the wheat produced in this State is from districts with 16in. or less average rainfall, and every the year the proportion is increasing. Very large areas with an average fall of 12in. to 14in. are profitably utilised for wheat-growing, and it is safe to say that in these districts the farmers will grow very profitable crops *on 9in. or 10in. of rainfall provided it falls at the right time* and proper methods of cultivation are practised.

Wheat and Meat Supply of the United States.

In an article contributed to a German agricultural paper, Mr. F. F. Matenaers discusses statistical data regarding the acreage and production of wheat in the United States from 1879 to 1908 inclusive, together with the exports of wheat and the increase of population during the same period. He draws the conclusion that in 15 years' time the United States will only be able to supply its own demand for wheat. Similar data on livestock production for meat are presented, and it is contended that the United States has already lost first place in the world's market and will gradually reach the same position in this respect as for wheat.

Topping Fruit.

In a Bill recently introduced into the Legislative Assembly of Victoria an attempt is being made to stop the practice of topping up packages of fruit with specimens of superior quality to the bulk of the fruit. Canada has had legislation of this character for a number of years, the aim, of course, being to protect purchasers against fraud. While the practice of making the best show of goods which one has for disposal is perfectly legitimate—one has only to note the attractive appearance of strawberries if the top fruits in the punnets are arranged to hide the stems, and cherries also as compared with the same fruits put in anyhow—the system of “topping” is carried out with the object of deceiving the purchaser. The provision in the Victorian Bill reads to the following effect:—No person shall sell any package or lot of fruit unless the faced or shown surface of such fruit is a true indication of the quality of the whole of the fruit in such package or lot, and any person selling fruit in contravention of this section shall be liable on conviction to a penalty of not exceeding £5. The Bill is the result of bitter complaints during late years by buyers of the extent to which this practice—which, by the way, is not altogether unknown to South Australia—has been carried on by a section of the trade.

Seaweed as a Manure.

In a lawsuit recently brought by farmers to determine the compensation due them for deprivation of rights to collect seaweed on the shores of the Firth of Forth, evidence was given as to the importance and methods of the use of seaweed in the production of early potatoes in Ayrshire and Jersey, and as to the fertilising value of inshore ware and tangle. The analyses submitted showed that the inshore ware contained about 70 per cent. of water, 0.43 per cent. of nitrogen, 0.09 per cent. of phosphoric acid, 0.9 per cent. of potash, and 0.5 per cent. of lime; the tangle contained 85 per cent. of

water, 0.26 per cent. of nitrogen, 0.13 per cent. of phosphoric acid, 1.58 per cent. of potash, and 0.34 per cent. of lime. According to the "Experiment Station Record" of the United States Department of Agriculture, the evidence tended to show that the seaweed was fully equal, if not superior, to barnyard manure.

Dairying in South America.

Dairying in the extra-tropical countries of South America has undergone considerable development during the last few years. An article in the bulletin of the Argentine Ministry of Agriculture for November last shows that in that country the industry was confined to supplying home demands until 1894, when exportation began, and in 1903 the exports of butter amounted to 5,330,000 kilos (1 kilo = nearly 2½ lbs.). Since that date the exportation has fallen off owing to vexatious provincial and municipal taxes in the province of Buenos Aires, the licence for a creamery having been raised from 10 to over 200 dollars a year. On the other hand, some of the interior provinces of the Republic, such as Entre Rios, Corrientes, and Cordoba have by liberal measures, such as freeing the industry from all taxes for 10 years and giving a premium of 5 per cent. on all capital invested in butter factories and creameries, encouraged many such establishments to begin work. The writer of the article (Dr. Pedro Bergés) is careful to point out that until her milking strains and methods are vastly improved Argentina cannot become an important competitor in the world's market for dairy produce. In 1907, Argentina, with about 26,000,000 cattle, exported only 3,000,000 kilos of butter, while little Denmark, with only 1,800,000 head of cattle, exported over 86,000,000 kilos. Danish cows give generally 25 to 28 litres of milk daily of such richness that it only requires 12 litres to make a kilo of butter (1 litre = 1.05 quart). Argentine cows, on the contrary, give, as a rule, only two to three litres of milk per day, and it requires 28 litres of such milk to make a kilo of butter. None of the other countries of Latin America is an exporter of butter, except Chili, which does a small trade with some ports in the Pacific, and Uruguay, which has great possibilities, but at present has scarcely exceeded the local consumption.

The Wheat Standard.

At a meeting of the Corn Trade Section of the Chamber of Commerce, on Wednesday, January 11th, the weight of the standard bushel of wheat was fixed at 62½ lbs. Last year it was also 62½ lbs.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying; &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

MIXING FERTILISERS.

"W. B. W.," Tumby, writes—"Next year I intend to dry off the seed wheat (after pickling) with a shovelful of quicklime, and mix about 10lbs. of sulphate of ammonia and 10lbs. of sulphate of potash with the seed (to save mixing it with the super.), and to sow also 50lbs. of super. guano. Would there be any injury to the seed?"

The Inspector of Fertilisers (Mr. W. L. Summers) replies—"It is not advisable to mix sulphate of ammonia and sulphate of potash with damp wheat which has been dusted with quicklime. The best plan is to ask one of the Adelaide firms manufacturing guano super. to mix the ingredients in the manure."

MARE NOT CLEANSING AFTER FOALING.

"J. McK.," Millicent, writes—"Please advise in the *Journal* treatment for mare not cleansing after foaling."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Cleansing should be removed. If the owner is near a qualified veterinary surgeon his services should be procured; otherwise the farmer must attend to the mare himself. After cleansing the hands in antiseptic solution, the owner should make a point of looking for the dark-colored outer foetal membrane—the chorion—the outside surface of which is closely applied to and connected with the inner lining membrane of the womb. Pull gently but firmly on this dark-colored membrane, the direction downwards and backwards, and the whole of the membrane will come away and fall on the ground between the mare's legs. Afterwards irrigate the womb and vagina with a weak antiseptic solution, e.g., lysol and water. Attend to mare's comfort, food, &c."

NON-FRUITING OF LOQUAT TREE.

"E. W. S.," Rocky Gully, writes—"I have a loquat tree (20 years old) which is a very poor bearer. It blooms very freely, but does not bear more than a dozen loquats. The variety is a late one. I have pruned the tree well back, but this does not seem to improve the results. Can you give me any information in the matter?"

The Horticultural Instructor (Mr. Quinn) replies—"Unless there is local evidence (in the same garden) to the contrary, I imagine the position is too frosty for the loquat to fruit satisfactorily. This tree grows and blooms freely in many frosty localities in the State, but fruits sparsely. The essential organs of the blossoms are extremely susceptible to injuries from frost."

PROPAGATION OF THE LOGANBERRY.

"H. J. A.," Dingabledinga, writes—"Can you please tell me how to root loganberries—are they worked from layers or cuttings?"

The Horticultural Instructor (Mr. G. Quinn) replies—"The loganberry is propagated either by layering the canes, dividing the young offsets, or by cuttings. If layers are made, peg the shoots down, keeping a few inches of the end erect and uncovered. When dividing the offsets discard the old stumps as far as practicable. Cuttings about a foot long should be planted deeply in moist soil, only about 2in. being left exposed."

MORTALITY IN YOUNG PIGS.

"Port Elliot" writes—"I should like to have an opinion as to the cause of young pigs dying at the age of about four or five weeks. The sow was fed on slops and separator milk (not straight from the separator). Five of the young pigs died at intervals of a day or so, but the sow and remaining pigs seem in the best of health."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"The young pigs were evidently affected with pasteurellosis, a disease of young pigs due to a specific microbe which probably gains entrance through the umbilicus shortly after birth. As soon as pigs exhibit symptoms of disease, or die from some unknown cause, it is the duty of owners to immediately notify the nearest inspector of stock and the Chief Inspector of Stock, Adelaide (*vide* section 19 of the Stock Diseases Act, 1888). In order to prevent the disease owners should pay particular attention to the sanitation of the pigsties and paddocks. The premises should be regularly cleansed and disinfected, and special cleansing and disinfection is recommended just before the sows litter. The application of a little antiseptic to the navel string of each young pig at the time of birth will prevent the introduction of micro-organisms."

MILLING EXPERIMENTS.

II.—THE PARAFIELD WHEATS.

By A. E. V. RICHARDSON, M.A., B.Sc. (Agric.), Acting Director
of Agriculture, and G. H. Stevens, Departmental Miller.

The object of this article is to outline the main characteristics of the wheat harvested at Parafield during 1909, and to deal with several problems of interest to the milling industry.

Owing to the fact that important milling investigations were being carried out in the early part of the season, it was impossible to complete the milling and analyses of these wheats at an earlier date.

It is very desirable to place on record each year the milling characteristics of our most important wheats, for in this way a great deal of important information on the effect of season and climate on our principal wheats will be obtained, and a yearly record of the milling values of these wheats will serve to mark the amount of progress in the very important department of wheat improvement. The number of wheats dealt with last season was not large, but this season we expect to be in a position to supply a fairly complete record of the milling values of typical South Australian wheats.

STRUCTURE OF THE WHEAT KERNEL.

Before entering into details it might be well to describe in an elementary fashion the structure of a typical grain of wheat and the functions of the several parts in the process of milling.

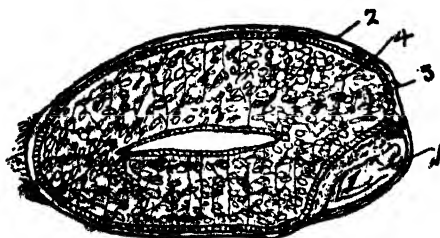


FIG. I.

Diagrammatic Section of Grain of Wheat cut through the Crease.

1. Embryo. 2. Protective Coats, 3. Aleurone Layer, 4. Endosperm.

The wheat kernel consists of three parts (*vide* Fig. I.)—(1) Embryo, or germ; (2) endosperm; (3) protective coats. The embryo or germ lies at the end opposite the brush and represents in miniature the future wheat plant. In a microscopic section, both the future stem (plumule) and the future root (radicle) may be detected within the embryo, as well as the protective sheath.

The bulk of the grain is composed of large rectangular cells filled with starch granules of varying sizes. This constitutes the endosperm, and represents the storehouse from which the young plant derives its nourishment in the early stages of its growth.

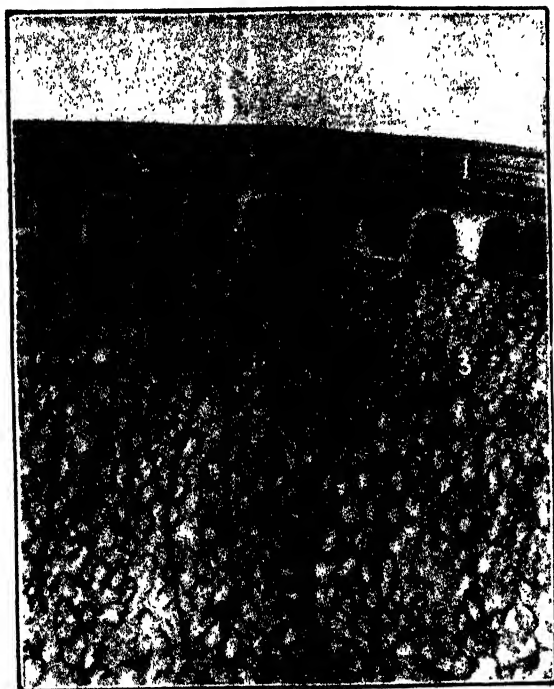


FIG.-II.

1. *Protective Coats.* 2. *Aleurone Layer.* 3. *Endosperm.*

According to Mege-Mouries, the endosperm constitutes 90 per cent. of the wheat kernel. The endosperm is the most important part of the grain to the miller, because from this he derives his flour. It must not be supposed that all the endosperm is pure flour. A fair proportion represents the film or tissue forming the walls of the rectangular cells above described, and it is this portion which we find in the dust-rooms and exhaust-boxes.

It is probable, therefore, that the actual flour in the best wheats does not much exceed 80 per cent., and in practice with the ordinary type of wheats the actual milling returns of flour do not much exceed 70 per cent., though of course the theoretical percentage is considerably above this figure.

The protective coats are four in number—the outer skin, or epidermis; the epicarp; the endocarp; and testa. These, of course, constitute the bran; and so accustomed are we to regard the bran as consisting of one coat that some proof is necessary to convince the casual observer to the contrary.

The structure may be illustrated by a microscopic section of a grain of wheat, taken longitudinally through the embryo and brush.

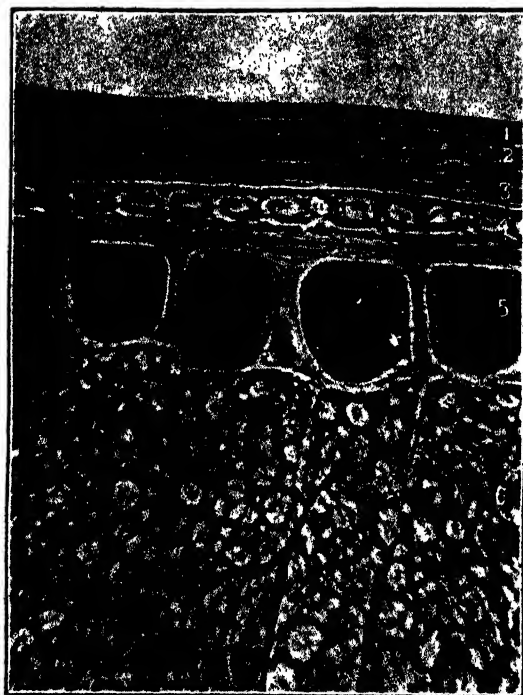


FIG. III.

1. *Epidermis.*
2. *Epicarp.*
3. *Endocarp.*
4. *Testa.*
5. *Gluten Cells (Aleurone Layer).*
6. *Starch Cells (Endosperm).*

Figs. II. and III. illustrate the microscopic structure of a typical grain of wheat. We are much indebted to the Government Bacteriologist (Mr. J. Desmond) for valuable assistance, and also to Mr. R. Williams, of this department, for preparing the sections and for the production of the microphotographs.

FLOW SHEET OF MILL.

Before proceeding with the details of the milling experiments we would draw the attention of those interested in the practical side of the subject to the flow sheet of the mill.

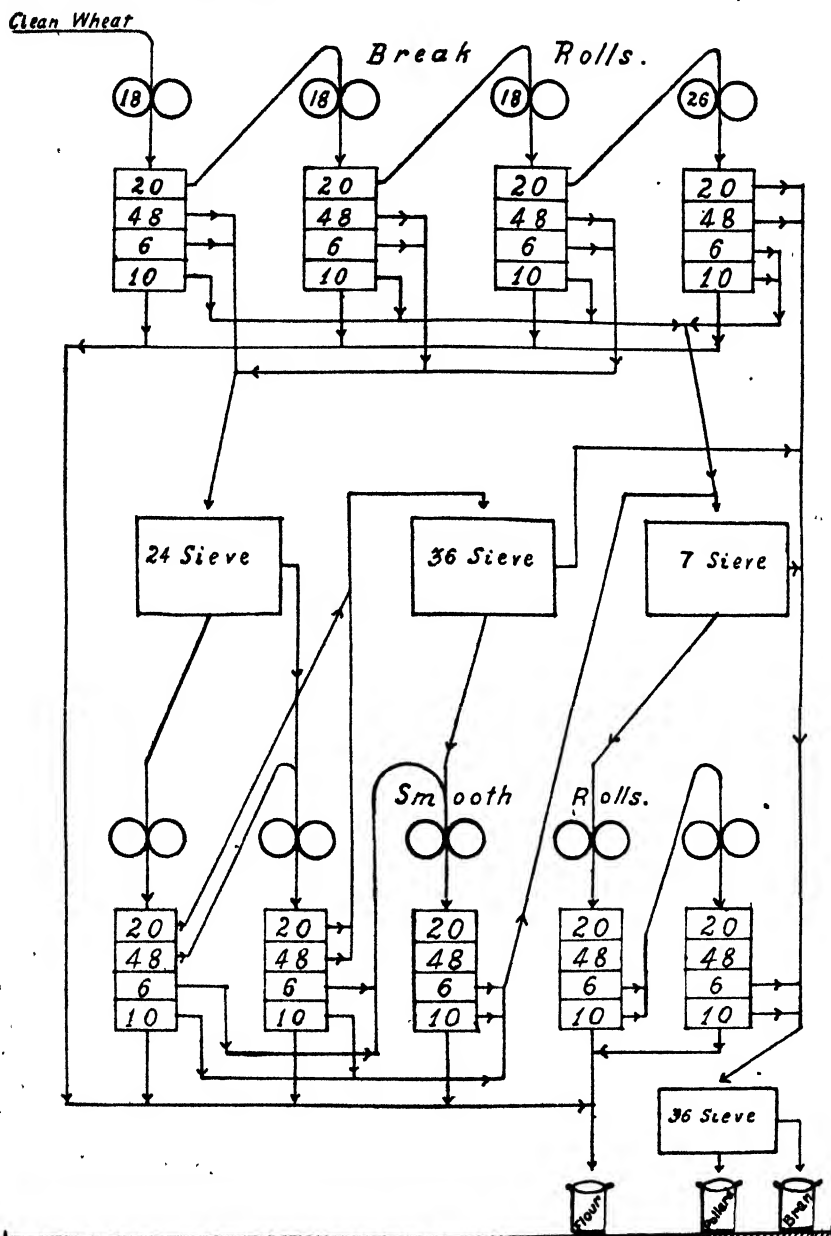


FIG. IV.—Flow Sheet of Mill.

Several alterations have been made during the past season in the manner of working the mill, and these alterations have made for considerable improvement in the results. We submit the attached flow sheet for the criticism of the practical miller.

CONDITIONING OF WHEAT.

The work of wheat-conditioning is looked upon by practical millers as a preliminary of first rate importance to good milling.

By conditioning is meant the addition of moisture to the grain in sufficient quantity to toughen the outer coverings of the berry, so that while the wheat is undergoing the process of "breaking" the bran will be kept as nearly intact as possible, and not allowed to become pulverised and mixed with the middlings which are released in the breaking operation.

It has for its object the alteration of the natural condition peculiar to the wheat itself, *e.g.*, if too hard, conditioning softens the wheat; if too harsh and brittle, it toughens the bran. Conditioning implies, then, washing the wheat in some form or other. Now, it is a well-known fact that practically all samples of wheat when immersed in water will cause a certain amount of discoloration in the water, and anything which discolors water will be detrimental to the quality of the flour. Previous articles have dealt in some detail with the meaning of the terms color, strength, and gluten, and nitrogen content, and the significance of these terms in the business of milling and in the question of wheat improvement. Further repetition in these matters is therefore unnecessary.

It is of interest, however, to find out what effect conditioning has on these important properties. The fact that many practical millers every day are conditioning their wheats shows that the process is a practical one and must result in profit to the users.

So far as the question of strength is concerned, it cannot be supposed that any increase in strength is possible, though it might be argued that a decrease in strength is inevitable; in fact, we are aware that many practical millers, whose object is the production of flour of high strength object to conditioning solely on this ground. The argument advanced to support this contention is that as strength is measured by the extent to which moisture is taken up by the flour to make a dough of definite consistency, it must follow that any moisture absorbed by the kernel during the conditioning process would lessen the capacity of the resulting flour for absorbing moisture, and therefore lead to a deterioration of strength. We are prepared to admit that if conditioning is allowed to proceed too far or is done carelessly a lowering of strength in the resultant flour takes place. We also unhesitatingly affirm, however, that if proper care is taken in the work of

conditioning there is no interference with the flour strength. A moment's careful consideration will explain why this is so.

In conditioning the moisture is never given time to penetrate further than the outside covering of the kernel. Were the conditioning allowed to proceed so far as to induce sweating in the grain or fermentation, so that the granules of the endosperm were moistened, the conditioning would undoubtedly interfere with the strength.

The conditioning improves the color considerably. This is what might be expected from what has already been said. The washing during the conditioning process removes the dirt on the exterior of the berry more effectively than any mechanical cleaning machine, and the resultant flour is therefore likely to be much improved.

So far as the gluten content is concerned we would not expect any difference between conditioned and unconditioned flour.

A number of varieties of wheat were milled in the conditioned and unconditioned form to ascertain how far conditioning affected the principal properties of the flour. Table I. summarises the results.

TABLE I.
Conditioning of Wheat.

Variety.	Water Absorbed	Color	Nitrogen Content.	Dry Gluten.	Wet Gluten	Factor N.	Strength
	%		%	%	%	%	
1. Gluyas—							
Conditioned	3.05	Very good	1.59	8.85	25.45	5.57	43.0
Unconditioned ..	—	Good	1.55	8.6	26.9	5.55	43.0
2. Marshall's No. 3—							
Conditioned	2.48	Very good	1.47	8.05	23.8	5.48	46.0
Unconditioned ..	—	Good	1.45	7.95	24.3	5.48	46.0
3. Comeback—							
Conditioned	2.57	Good	1.67	8.9	24.55	5.33	55.6
Unconditioned ..	—	Fair	1.66	8.8	23.15	5.30	55.0
4. Bunyip—							
Conditioned	3.71	Bad	1.862	9.7	26.75	5.21	55.4
Unconditioned ..	—	Bad	1.953	9.8	28.3	5.02	57.0
5. Dart's Imperial—							
Conditioned	3.91	Very good	1.645	8.65	28.5	5.26	45.0
Unconditioned ..	—	Very good	1.596	8.85	27.55	5.54	45.0
6. Crossbred 28—							
Conditioned	2.0	Very good	1.032	9.5	28.6	4.92	47.2
Unconditioned ..	—	Very good	1.876	9.9	29.6	5.28	47.6

A survey of the table will reveal the fact that the nitrogen content, the percentage of wet and dry gluten, and the strength are not materially altered

by the conditioning, and this is what we should expect from theoretical considerations. Moreover, wherever careful attention has been given to the work of wheat-conditioning the strength is not seriously interfered with. In the case of Bunyip it will be noted that the conditioning is accompanied by a lowering of the strength. In this particular instance the conditioning was carried so far that the moisture penetrated the endosperm. As this conditioned flour diverged considerably from the unconditioned flour in strength, a special investigation was made and the results will be disclosed in our next article.

It is, of course, not always possible to indicate by mere verbal distinctions differences in the colors of flours. The differences between sets of flours are often so subtle and minute as to almost baffle logical analysis. Taking the conditioned wheats as a whole, however, they are slightly superior to the unconditioned wheats.

Conditioning, then, when carefully supervised, does not interfere with the strength of the flour, nor does it affect in any way the nitrogen and gluten content. It leads to a slight improvement in color, and it certainly gives an increased quantity of mill products, because, as will be shown later, a considerable portion, though not all, of the moisture absorbed during the conditioning process is retained by the mill products, and thereby the possible profits are increased. Moreover, the milling can be performed with greater facility, since the conditioned wheat is easier to mill than the unconditioned wheat.

PARAFIELD WHEATS, 1909.

Some 20 varieties of wheat grown at Parafield during the season 1909-10 were subjected to a detailed milling analysis.

It is generally admitted that climate and soil have a great influence on the composition of the wheat kernel, and if this is so we should not expect the same composition in, say, Federation, grown in the Far North, in the central district, and the extreme South-East. This has, indeed, been the general experience—that the same variety materially differs in composition and properties in the different districts of the State and in the different States of the Commonwealth.

A start was made last season on the milling of the Parafield wheats, and if each season the wheats of any given station be subjected to an exhaustive milling analysis much useful and valuable data will gradually be accumulated, and much light will be thrown on the causes of seasonal variations in the milling qualities of our wheats. If, in addition, given varieties of wheat from the State experimental farms be submitted to a similar regular analysis the value of the data obtained would be greatly enhanced.

The following table summarises the milling values of the more important Parafield wheats of 1909-10.

PARAFIELD WHEATS, 1909-10.

Variety of Wheat.	Weight Taken.	MILLING PRODUCTS.				Color.	Nitrogen Content.	Dry Gluten.	Wet Gluten.	Factor N.	Strength per Quarter per Bush.	Break Flour.	Water Absorbed.	Consistency of Dough.
		Flour.	Bran.	Pollard.	Weight Recovered.									
1. American No. 8..	grains 10,500	% 71.3	% 13.7	% 15.0	Good	% 1.617	% 9.10	% 27.45	% 5.63	48.4	48.4	grs. 1,920	540	Fairly firm, not elastic, extensible.
2. Baroota Wonder.	10,500	70.4	17.2	12.4	Very fair	1.743	8.40	22.0	4.82	49.0	49.0	1,630	310	Firm, short, elastic.
3. Crossbred 28 ...	10,500	68.2	15.4	16.4	Very good	1.806	9.2	24.45	5.09	49.2	49.2	1,440	401	Fairly soft, elastic, short.
4. Bunyip	10,500	68.1	15.2	16.7	Poor	1.897	10.0	28.6	5.27	56.3	56.3	1,610	460	Fairly soft, short, elastic.
5. Comeback	10,500	71.0	13.3	15.7	Good	1.67	8.9	24.55	5.33	55.6	55.6	1,600	270	Firm, elastic, short.
6. Correll's No. 7 ..	10,500	69.0	15.2	15.8	Fair	1.708	9.35	29.9	5.47	40.2	40.2	1,650	425	Fairly soft, slightly elastic.
7. Cumberland	10,500	68.4	13.9	17.7	Good	1.757	9.97	29.35	5.67	45.6	45.6	2,100	400	Firm, elastic, short.
8. Dart's Imperial ..	10,500	70.9	13.1	16.0	Excellent	1.372	6.3	19.2	4.6	44.0	44.0	2,200	370	Firm, not elastic.
9. Federation.....	10,500	70.7	13.5	15.8	Very good	1.40	6.57	18.20	4.69	46.0	46.0	1,770	290	Fairly soft, fairly elastic.
10. Firbank	10,500	70.0	17.0	13.0	Good	1.80	9.6	25.75	5.33	48.0	48.0	1,610	370	Fairly soft, elastic, short.
11. Gluyas	10,500	72.0	11.8	16.2	Good	1.56	8.80	27.3	5.64	43.0	43.0	1,805	340	Very firm, sticky, extensible.
12. Huguenot	10,500	68.0	15.6	16.4	Very bad	1.785	9.6	27.4	5.38	61.4	61.4	820	470	Sticky, firm, not elastic.
13. Indian I	10,500	72.1	13.6	14.3	Bad	1.953	10.20	29.8	5.22	61.0	61.0	1,360	240	Firm, elastic, short.
14. King's Early ..	10,500	70.6	15.8	13.6	Very fair	1.891	10.2	33.3	5.39	42.4	42.4	2,000	290	Fairly firm, elastic.
15. Marshall's No. 3 ..	10,500	71.0	15.2	13.8	Very good	1.45	7.95	24.3	5.48	46.0	46.0	1,620	340	Firm, sticky, extensible.
16. Medeah	10,500	68.3	15.4	16.3	Bad	1.61	8.7	24.8	5.4	58.5	58.5	960	390	Sticky, firm, not elastic.
17. Triumph	10,500	72.6	13.0	14.4	Very good	1.456	7.9	21.45	5.43	45.4	45.4	1,720	360	Soft, fairly elastic.
18. Tarragon	10,500	71.0	15.6	13.4	Very fair	1.967	8.75	24.25	4.45	49.0	49.0	1,450	310	Short, fairly firm, elastic.
19. Yandilla King...	10,500	72.2	13.1	14.7	Very good	1.435	8.2	25.3	5.68	48.0	48.0	1,825	400	Fairly firm, not elastic.
20. White Tuscan...	10,500	71.8	13.6	14.6	Very good	1.652	8.20	25.6	4.96	45.4	45.4	1,800	335	Soft, elastic, extensible.

We need add but little in explanation of the table, as the significance of the various milling qualities has already been dealt with.

(1) The figures in the tenth column are obtained by dividing the gluten content by the nitrogen content of the flours.

In milling literature it is generally admitted that the total proteids in a given sample of flour can be determined by multiplying the percentage of nitrogen in the flour by the factor 5.76. The factor 5.76 is used because it is supposed that the average percentage of nitrogen in the proteids of the wheat kernel is 17.36 per cent. Of course, the principal proteid in flour is gluten, which, as explained in a previous article, is made up of glutenin and gliadin. It will be noted that this factor N varies very considerably, being 4.45 in Tarragon and 5.68 in Yandilla King.

(2) The gluten and nitrogen contents of the flours vary very considerably, being lowest in Dart's Imperial and highest in Indian I. and King's Early.

The variation in strength is considerable, being lowest in Correll's No. 7 and King's Early, and highest in the Macaroni wheats, Huguenot and Medeah, and the Punjab wheat Indian I. The two former are to be condemned, in spite of their high strength, on account of the extremely bad color of the flour and the inelastic, lifeless dough.

Indian I. gives a good yield of flour, has a high nitrogen content, and is very strong, though its color is poor. This variety, moreover, is exceedingly early, and is likely to be of much value in the improvement of our ordinary varieties by crossing.

(3) A considerable difference will be noted in the yield of break flour of the different varieties. The amount varies from 8 per cent. to 9 per cent. of the total weight of wheat in varieties like Huguenot and Medeah, to over 20 per cent. in varieties like Cumberland and Dart's Imperial.

The question of break flour will, however, be considered in detail in a later issue.

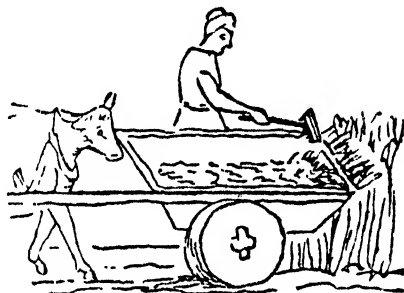
(4) It will be noted that the weight of milling products recovered is usually more than the amount of wheat used. This is explained, of course, by the fact that in milling 10,500 grains (1½ lbs.) of wheat is weighed out and then conditioned. During the conditioning process, of course, a considerable amount of moisture is absorbed, varying with the variety of wheat milled. The amount varies roughly from 2 per cent. to 5 per cent. A considerable proportion of this moisture is lost in milling, chiefly owing to evaporation through the heat caused by the friction of the rolls, and to the fineness of subdivision of the kernel, which vastly increases the evaporating surface.

(To be continued.)

DEVELOPMENT OF THE STRIPPER.

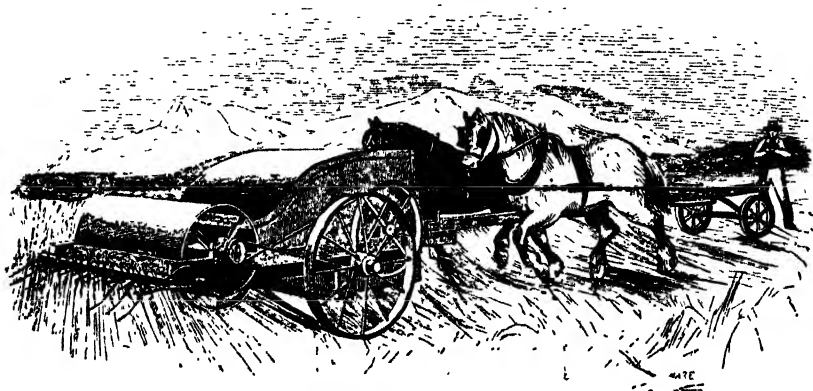
A NEW HARVESTER.

South Australia has taken such a prominent part in the perfecting of harvesting machinery that the introduction of a new machine for reaping and bagging grain deserves more than passing notice. Probably in no part of the world is the harvesting of the wheat crops carried out more cheaply and more



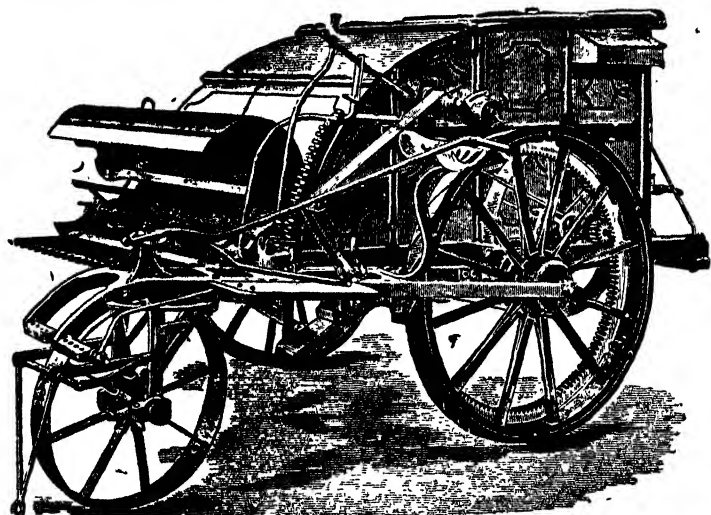
The First Recorded Reaping Machine.

effectively than in this State, and in both these respects the new machine seems likely to establish itself as a distinct improvement on previous harvesting methods. The progress which has been made in the invention and manufacture of harvesting machinery since the late Mr. Ridley invented his stripper has been remarkably rapid. Many persons can remember when



The Original Ridley Stripper.

it was the practice to reap the crops by hand, and it is on record that during the first decade of South Australia's history, owing to the dearth of agricultural laborers and the comparatively large area under wheat, the residents of Adelaide, including 150 soldiers who were stationed in South Australia, turned out to assist in garnering the grain; indeed, during the last 30 years in the wetter districts of the State, where the stripper was not suitable for reaping the heavy crops owing to the damp conditions, and where mowers and binders and threshing machines were scarce, it was not an uncommon sight to see an army of reapers mowing the wheat with scythes, while assistants came after them and tied up the sheaves. The history of farming in South Australia shows clearly that the wheatgrower has benefited immensely by the application of science and inventive skill to harvesting methods, and so



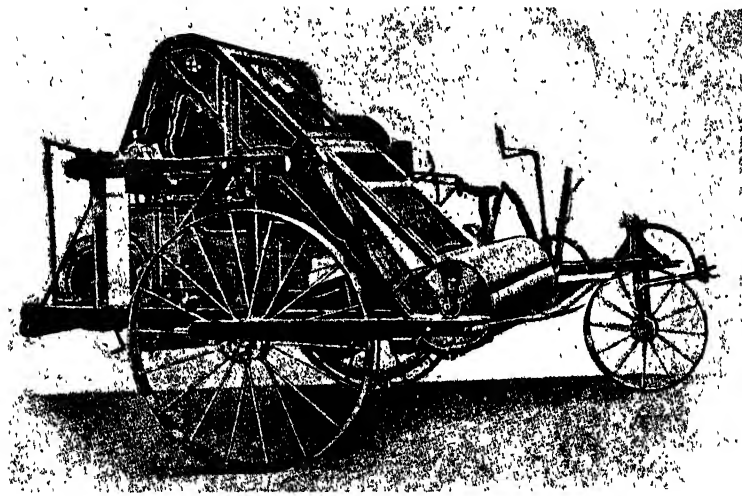
An Up-to-Date Stripper.

complete are the means at the farmers' disposal for the rapid and cheap harvesting of his crops that it would seem that the inventor has little scope for further advance.

The story of the development of the stripper was told in an interesting manner in an article by Mr. W. L. Summers in the *Journal* of July, 1907, at the time of the movement to establish a memorial to the late John Ridley, the South Australian inventor of the stripper, and it is only necessary now to recapitulate the principal facts which his research elicited. Our first illustration, taken from Loudon's "Encyclopædia of Agriculture," shows the earliest recorded form of reaping by machinery. According to Pliny, this machine was used in Gaul in the time of Julius Cæsar, so that the practice of stripping the wheat heads from the plants by means of a comb is as old as the Christian era. It is remarkable that the basic idea of Ridley's invention

should have been obtained from a picture of this Gallic stripper. Loudon's "Encyclopædia of Agriculture" was first published in the 'thirties, and it was at the end of September, 1843, that Ridley, then a young man of 37 years of age, produced his machine and gave public exhibitions of it in the Hindmarsh district. In March, 1886, in a letter to the press, he admitted that he obtained the first idea of the machine from the illustration published in Loudon's work. He wrote—"I have always said that the first suggestion of my machine came to me from a notice of a Roman invention given in Loudon's 'Encyclopædia of Agriculture.' To this I now add the statement that from no other source did I receive the least help or suggestion."

Our second illustration is a picture of Ridley's original stripper reproduced from a sketch published in "South Australia and its Mines," by F. Dutton, who mentions that by the use of the stripper the cost of reaping, threshing, and cleaning for market was reduced fully two-thirds. The machine found



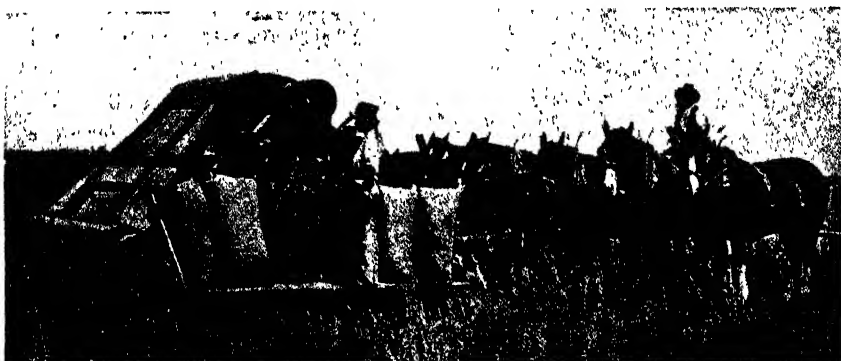
The Complete Harvester.

a ready sale throughout Australia, and it was generally admitted that the American machine known as the Californian header was inferior to it. Ridley did not patent his invention, and he reaped no financial benefit from it; but he had many tokens and assurances of the gratitude of South Australian farmers before he died in England at the ripe age of 81 years. A most interesting history of the invention of the stripper is published in a biographical sketch on the inventor by his daughter, Miss Annie E. Ridley, entitled "A Backward Glance."

From time to time Ridley's invention has been developed and perfected, and in recent years, following the damp-weather stripper, came the complete harvester, of which many thousands are now in use in Australia, and more

recent still is the push harvester, which is intended for use on large farming areas, and in working which Ridley's method of the horses pushing the machine before them is reverted to.

The latest machine of all, which is put on the market for the first time this year, is the Massey-Harris reaper-thresher, which possesses several features which are a distinct departure from the methods of the popular harvester.



The Sunshine Push Harvester.

In the first place the beaters at the back of the comb are dispensed with, and instead of the wheat heads being pulled off they are cut off by a reciprocating knife similar to the knives of grass cutters and mowers. The heads fall on to a belt-conveyer, and are thence fed into the thresher, from which a marketable sample of wheat is carried to the bags on the platform at the



The Massey-Harris Reaper-Thresher.

side of the machine. The straw and cocky chaff escape from the side of the thresher, and practically every grain of wheat is saved. One of the great advantages of the machine appears to be its lightness of draught. As the heads are cut immediately they get into the comb, there is little or no resistance; the plants are not pulled out of the ground, and the shelling of wheat is reduced to a minimum. The lightness of draught permits of a swath of 8ft. being cut as against 5ft. and 6ft. with the ordinary harvester, so that a considerably larger area can be cut with the same amount of labor. As showing the capabilities of the machine, it is reported that Mr. L. Franks, of Mallala, has reaped 240 bags of wheat, or roughly over 720bush., in one day (from daylight to dusk) with one team and one man. Several opportunities have been given by the agents, Messrs. Clutterbuck Bros., for the officers of the Department of Agriculture and farmers to inspect the machine, and as a rule it has found much favor. One of the crops (averaging over 30bush. per acre) in which the machine was at work had gone down very much before the wind, and was much tangled, but by means of a false comb practically every head was saved. One of the machines has been purchased for the Agricultural College, and is being used for this year's harvest. The machine is placed on the market by the Massey-Harris Company, of Toronto, Canada, and while farmers would probably have preferred a home-made article, they have some consolation in the fact that a South Australian resident (Mr. M. H. East, of Mallala) has had a good deal to do in bringing the machine to its present state of perfection.



HARVESTERS ON A LARGE FARM.

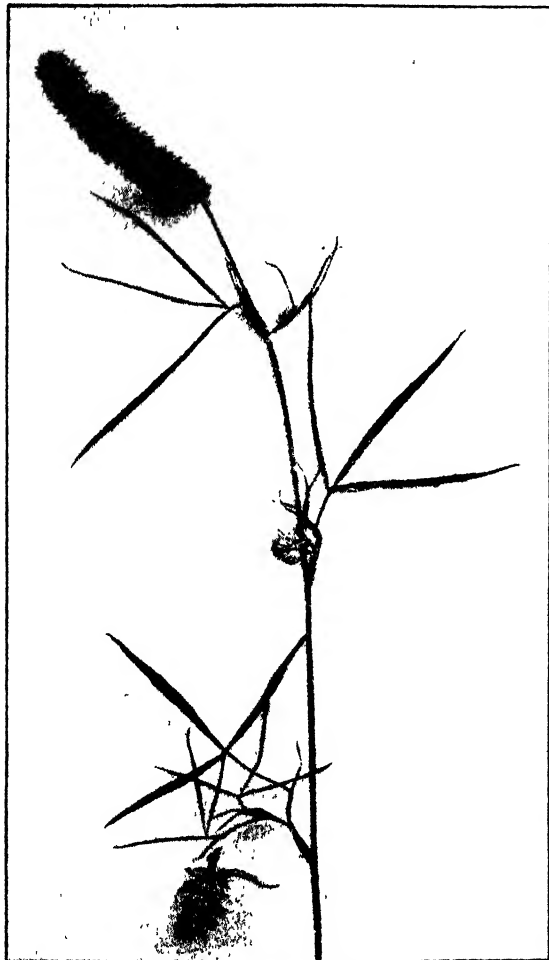
TWO INTRODUCED CLOVERS.

By W. L. SUMMERS.

During a recent visit to Keith I observed along the headlands of a paddock owned by Mr. D. Makin quite a number of varieties of *Trifolium*. These were particularly luxuriant in places, probably where manure bags had been emptied. Amongst these clovers was one new to myself, though it was quite plentiful in this paddock. I obtained several specimens to submit to Mr. J. M. Black, who identifies it as *Trifolium suffocatum*—a variety which had not been previously recorded in South Australia. The accompanying illustration, reproduced from Smith's "English Botany," shows the general habits of this clover. Although this variety is of fair value for fodder, it possesses no special merit. The flowers are very small and insignificant, of a pale rose color, forming dense sessile heads.



Trifolium angustifolium.—This variety is known as narrow-leaved clover. It is spreading rapidly through our Hills districts, and attention is called to it on account of its objectionable characteristics. Except when very young, it is scarcely touched by stock. The foliage is very scanty and the stalks hard and fibrous. The seed head is also uninviting to stock, and the result is that it seeds very freely. Under congenial conditions it is crowding out better herbage. The plant grows from 3in. to 18in. in height, according to the soil it occupies. The head is from 1in. to 3in. in length, the flowers being pink in color and small. The illustration, which will enable landowners to identify this clover, indicates the sparseness of the foliage. Inquiries concerning this clover have come to hand from a number of different districts during the past few weeks.



Trifolium angustifolium.

GOVERNMENT INSPECTION OF STALLIONS.

LIST OF CERTIFICATED HORSES.

The Chief Inspector of Stock (Mr. R. J. Needham) in his annual report writes as follows with respect to the examination of stallions by officers of his department :—

In accordance with the Government policy, the examination of stallions three years old and over for soundness and suitability for stud service was inaugurated at all subsidised shows throughout the State. The two veterinary officers engaged in this important work have worked with great energy in meeting all their engagements on the time-table of stallion parades, and have carried out their important duties with skill, tact, and without friction. The State of Victoria commenced the examination of stallions for soundness at subsidised shows in 1907, and consequently numbers of unsound stallions were sent to South Australia and disposed of, thereby largely increasing the percentage of rejects at our parades. The great majority of horseowners and farmers throughout the State are strongly in favor of the scheme of examination, but many do not think we have gone far enough, and ask for an Act providing for the registration and certification of all stallions plying for hire ; and, though no doubt such an Act should and will eventually be passed, it is all-important that any measure for the certification and registration of stallions should be uniform throughout Australia. It is, therefore, very necessary that in the near future a conference of Chief Inspectors of Stock and Government veterinary officers should be held to bring about uniform legislation.

The list of certificated stallions is as follows :—

From September 14th, 1909 to October 6th, 1910.

Name of Horse.	Age.	Owner.	Address.	Date.
DRAUGHTS.				
*Agent General	5 years	F. T. Fischer	Port Elliot .	9/9/10
Banker	3 "	Havilberg Bros.	Quorn	28/7/10
Belfast	4 "	A. C. Hewton	Yorke town	3/8/10
*Ben Lomond	7 "	H. W. Steinweidel	Balaklava .	24/9/09
*Bonnie Lad	Aged	J. A. Jaensch	Murray Brdg	23/3/10
*Bonnie Laddie	3 years	M. Coleman	Snowtown..	16/8/10

LIST OF CERTIFICATED STALLIONS—continued.

Name of Horse.	Age.	Owner.	Address.	Date.
<i>DRAUGHTS—continued.</i>				
Bonnie Pride	2 years	Dawkins Bros.	Two Wells .	6/10/10
Botany	3 "	H. J. Polgreen	Moonta ...	22/9/10
*Bramhope Monarch ..	6 "	G. Weatherell	Mt. Barker .	10/3/10
British Laddie	2 "	Wm. A. Bennett	Windsor ...	14/7/10
Briton	4 "	Saunders Bros.	Balaklava .	3/8/10
Camellus	6 "	J. P. and L. Schinckel ..	Mt. Gambier	20/10/09
*Carmyle	Aged	A. Worrall	Saddleworth	9/8/10
Charmer	3 years	W. H. Ey	Millicent ...	24/9/10
Clyde	8 "	J. A. Walker	Penola ...	13/10/09
Clydesdale Ben	6 "	E. Burt	Arthurton .	29/8/10
Colac	8 "	Ed. Goode	Kingston...	20/9/10
Conqueror	4 "	McKinnon Bros.	Port Elliot .	9/9/10
Donald Mackay	2 "	Jas. Keegan	Mt. Gambier	15/5/10
Duke of York	6 "	H. McColl	Wilmington	20/9/10
Dundonald	4 "	G. S. Robinson & Son ..	Balaklava .	3/8/10
Dundonald II.	5 "	Stanley Douglas	East Wagin, W.A.	3/8/10
Earl Grey	8 "	M. V. Kinnane	Orroroo ...	6/10/10
Earl of Drummond ...	4 "	D. Goldsmith	Yorketown .	3/8/10
Early Morning	5 "	Thos. Colebatch	Strathalbyn	22/10/09
Emperor	Aged	Jas. Robertson	Naracoorte .	23/9/10
Extinguisher	2 years	A. B. Wishart	Adelaide ...	23/7/10
Federation	3 "	J. Humme'l	Laura	5/8/10
Finstall Ambassador ..	6 "	W. Clezy	Woodside ..	15/11/09
Flower's Oak	2 "	J. D. Rowett	Eudunda ...	28/9/10
Gambier Hero	3 "	John Whitehead	Colton	2/6/10
General Cross	Aged	Job Bros.	Sheoak Log .	27/9/10
General Laddie	7 years	Copping Bros.	Lucindale ..	3/11/09
*Gladbrook	9 "	J. & M. Sullivan	Adelaide ...	22/7/10
Glancoer	3 "	John McGregor	Adelaide ...	20/7/10
Glasgow Ballock	4 "	J. & W. Sharp	Balaklava .	3/8/10
Glenmore	4 "	M. McCormack	Barunga Gap	16/8/10
Glenthorne Oban	3 "	Shand & Stanton	Two Wells .	6/10/10
Glenthorne St. Omer ...	2 "	H. A. Montgomery	Arthurton .	29/8/10
Glen Wallace	7 "	A. Boutell	Jamestown .	5/8/10
Hans	3 "	Zimmermann Bros.	Wilmington	30/9/10
Happy Willie	2 "	G. Bruce & Sons	Adelaide ...	21/7/10
Hazeldean	7 "	F. A. & A. R. Wood ..	Balaklava .	3/8/10
Heather Albyn	Aged	Freebairn & Lovelock ..	Laura	5/8/10
*Ian Lad	6 years	Roseworthy Ag. College	Roseworthy .	24/8/10
Ian's Pride	4 "	T. Travers	Orroroo ...	6/10/10
*John Balance	Aged	W. R. Lang	Crystal Brook	6/9/10
† Kinmore	2 years	J. Bodey	Adelaide ...	22/7/10
‡ Laird of Din	2 "	G. H. Hart	Yorketown .	3/8/10
*Lockeley	Aged	W. Potter	Bordertown .	20/8/10
*Lord Benmore		G. P. Hillier	Mt. Gambier	20/10/09
*Lord Hermiston	6 years	H. A. Montgomery	Arthurton .	29/8/10
Lord Hindmarsh	2 "	Hutchison & Barwise ...	Port Elliot .	9/9/10
Lord Kelso	9 "	G. R. Williamson	Orroroo ...	6/10/10
Lord Kitchener	7 "	S. Bottrill	Narrung ...	13/10/09
Lord Leicester	2 "	W. G. Secker	Lucindale ..	27/8/10
Lord Percival	3 "	Copping Bros.	Lucindale ..	27/8/10
*Lord Percy	6 "	A. Boutell	Jamestown .	5/8/10
Loyalty	2 "	J. Holloway	Adelaide ...	18/7/10
Mac Blend	Aged	Govt. Experimental Farm	Kybybolite .	3/4/10
Mackie Again	3 years	M. Rasheed	Adelaide ...	23/7/10

LIST OF CERTIFICATED STALLIONS—continued.

Name of Horse.	Age.	Owner.	Address.	Date.
DRAUGHTS—continued.				
Masher King	2 years	Chas. Underwood	Balacklava ..	3/8/10
Merry Lad	3 "	Carter Bros.	Penola	2/9/10
Merry Mac	2 "	John Holloway	Adelaide ...	18/7/10
Merry Oak	5 "	H. Wood	Balacklava ..	24/9/09
Maori Chief II.	7 "	Wm. Nolan, jun.	Glencoe East	15/5/10
Maori King	4 "	Geo. Cleggett	Langhorne's Creek	24/5/10
Model's Pride	3 "	M. Stevens	Bute	17/8/10
Moeraki	5 "	McArthur Bros.	Millicent ...	27/10/09
Mountain Chief	4 "	E. Correll	Minlaton ...	10/8/10
Musterer	4 "	E. E. Bristow	Wilmington	20/9/10
Navy Blue	6 "	Wm. Lightbody	Maitland ...	19/7/10
Oak Branch II.	2 "	Wm. A. Bennett	Windsor	14/7/10
Oak Chip	3 "	P. Marshall	Bordertown	20/8/10
Oak Lad	4 "	R. A. Hancock	Moonta	22/9/10
Oakland II.	4 "	C. R. Thiele	Murray Bridge	23/3/10
Oak Leaf	2 "	J. H. Rowe	Two Wells ...	6/10/10
†Paymaster	3 "	F. J. H. Cleggett	Langhorne's Creek	24/5/10
Percival	3 "	R. Ellery	Orroroo ...	6/10/10
Pride of Bakara	5 "	C. A. Rowe	Swan Reach	14/7/09
Pride of Barossa	6 "	F. Manzel	Gawler	22/9/09
Pride of Oak	5 "	C. Wake	Cowell	28/9/10
Prince	Aged	W. Smith	Naracoorte	26/8/10
Prince Albert	3 years	A. J. Inkster	Adelaide ...	22/7/10
Prince Roy	6 "	G. Wait	Balacklava ..	24/8/09
Ranfurly	8 "	W. R. Michael	Barunga Gap	17/8/10
Red Lion	3 "	J. & M. Sullivan	Balacklava ..	3/8/10
Rendelsham Major Grey	5 "	N. Brookman	Adelaide ...	14/9/09
Royal Arthur	8 "	Wm. McAnish	Kapunda ...	7/9/10
*Royal Blend	5 "	J. J. Francis	Winulta ...	20/7/10
Royal Chieftan	2 "	E. Jenkin, jun.	Two Wells ...	6/10/10
Royal David	4 "	F. Burns, jun.	Snowtown ...	16/8/10
Royal Enfield	4 "	H. Atyco	Gawler	24/8/10
Royal George	5 "	G. E. and J. H. Cleggett.	Laura	5/8/10
Royal Oak	5 "	Bowden Bros.	Moonta	22/9/10
Royal Lion	4 "	Kerin Bros.	Jamestown	5/8/10
*Royal Sandy	4 "	J. M. and E. F. O'Sullivan	Tarlee	30/9/10
Samson	4 "	R. Petherick	Kadina	26/9/10
Scotland's Style	4 "	John McGregor	Adelaide ...	20/7/10
Scottish Chief	Aged	G. H. Hart	Yorketown ...	3/8/10
Shamrock Boy	4 years	W. T. Lewis	Colton	2/6/10
Shire Chief	2 "	Jas. Sampson	Balacklava ..	3/8/10
Sir Colin	2 "	C. H. Dunn	Mt. Barker ...	10/3/10
Sir Hector McDonald ..	8 "	Fitzgerald Bros.	Adelaide ...	14/9/10
*Sir Robert	5 "	W. H. Sires	Balacklava ..	3/8/10
Sir Wallace	5 "	H. R. Haywood	Two Wells ...	6/10/10
Sir Walter	5 "	D. Dabinett	Adelaide ...	20/7/10
*Sir William	6 "	E. J. Kennedy	Naracoorte	26/8/10
Southern Star	6 "	Hill Bros.	Adelaide ...	14/9/09
Stokade Fancy	3 "	Job Bros.	Shesook Log	27/9/10
Superior	2 "	A. Gardiner	Adelaide ...	22/7/10
*Tasari Knight	3 "	Richd. Petherick	Adelaide ...	22/7/10
Tatara Chief	3 "	Langley Bros.	Bordertown	20/8/10
The Count	2 "	L. and L. Dunn	Adelaide ...	21/7/10

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
DRAUGHTS—<i>continued.</i>				
The General	5 years	Chas. Foley	Arthurton ..	29/8/10
The Masher	Aged	J. Holloway	Mt. Gambier	20/10/09
The New King	2 years	G. Cleggett, jun.	Adelaide ...	22/7/10
True Blue	11 "	W. Rodder	Moonta	29/9/09
*Tweedside Again	5 "	C. J. White	Mt. Gambier	3/9/10
Unity Again II.	3 "	G. Cummings	Bute	17/8/10
Unity's Pride	2 "	Percy Kilsby	Penola	2/9/10
Vanquisher	5 "	John Foster	Robe	22/9/10
Victor	Aged	McCabe Bros.	Mt. Gambier	10/9/10
Victory	3 years	T. Kenny	Arthurton ...	29/8/10
*Wallace	3 "	Hill Bros.	Georgetown ..	4/8/10
Willowby	5 "	P. J. Harvey	Jamestown ...	5/8/10
Wimmera Chief	5 "	C. H. Dunn	Adelaide ...	14/9/09
†Young Agitator	5 "	Fitzgerald Bros.	Saddleworth ..	9/8/10
Young Charmer	3 "	C. Cant	Balaklava ...	3/8/10
Young Darnley	8 "	J. and J. Francis	Adelaide ...	19/7/10
Young Flashwood	5 "	Fisher Bros.	Bordertown ...	20/8/10
Young McKay	4 "	C. Werchon	Millicent ...	24/9/10
Young Maori	4 "	Reschke Bros.	Penola	2/9/09
Young Model Hero	7 "	J. C. E. Rudiger	Robertstown ..	29/9/09
Young Montrave	7 "	J. and M. Sullivan	Balaklava ...	3/8/10
Young Montrose	5 "	J. A. Ratten	Balaklava ...	3/8/10
Young Mountain Hero	5 "	E. and W. Branson	Tarlee	30/9/10
Young Percival	4 "	Langley Bros.	Bordertown ...	20/8/10
Young Pride of Oak ..	6 "	J. Nankivell	Minlaton ...	10/8/10
*Young Shepherd King ..	3 "	M. C. Kennedy	Millicent ...	24/9/10
Young Sir David	2 "	J. and H. Hurst	Kapunda ...	7/9/10
LIGHT.				
Appremont	6 years	R. W. Rowett	Eudunda... ..	29/9/09
Baron Policy	5 "	J. G. Shulz	Swan Reach ..	4/7/10
Baron Rothschild	9 "	R. Smith	Adelaide ...	14/9/09
Black Douglas	5 "	T. H. Wilkie	Snowtown... ..	16/8/10
Bonfire	4 "	W. G. Burroughs	Adelaide ...	23/7/10
Boomerang	4 "	J. G. Jaensch	Murray Brdg. ..	23/3/10
Bosco	4 "	Meyerhoff Bros.	Adelaide ...	13/9/10
Cashier	7 "	R. Crittenden	Adelaide ...	14/9/09
Countryman	8 "	W. C. Hill	Petersburg ...	4/10/10
Cronje	Aged	Klinger Bros	Balaklava ...	3/8/10
Darkfish	5 years	F. J. Bateman	Millicent ...	24/9/10
Derby	4 "	H. Pannell	Bute	7/8/10
*Experience	Aged	Jacob Rosenberg	Adelaide ...	17/9/10
Foreigner	"	G. Wyatt	Two Wells ...	7/10/09
Frank Harold	7 years	Meyerhoff Bros.	Adelaide ...	14/9/09
Fusilier	3 "	F. J. Dodd	Port Elliot ...	9/9/10
Gaylock	9 "	J. R. Marston	Yorketown ...	3/8/10
General	6 "	J. Dodd	Strathalbyn ...	22/10/09
Goshawk	5 "	Paul Zerk	Cowell	28/9/10
Grainger II.	4 "	F. W. Klopper	Crystal Brk. ..	7/9/10
Hamlet	Aged	Brooks Bros.	Yorketown ...	3/8/10
Hot Wind	"	W. Jones	Naracoorte ...	26/8/10
Juggler King	5 years	Jno. Ireland	Hawker ...	6/10/10
Listen-to-me	5 "	C. C. Nitschke	Millicent ...	24/9/10
Lord Collingwood	11 "	R. J. Dennis	Adelaide ...	14/9/09

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
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LIGHT—*continued.*

Marsden	6 years	T. O'Dea	Murray Brdg.	23/3/10
Morn Child	5 "	J. N. Hood	Colton	2/6/10
Nimrod	3 "	A. E. Anderson	Yorketown ..	3/8/10
Osty	3 "	F. H. Lee	Wilmington ..	20/9/10
Ostymarsh	6 "	F. E. Fisher	Strathalbyn ..	22/10/09
Pawnbroker	Aged	J. R. Brown	Gawler	24/8/10
Producer	"	J. Grindall	Adelaide ..	14/9/09
Rocket	4 years	Havilberg Bros.	Quorn	28/7/10
Romeo II.	Aged	W. A. Bennett	Windsor	14/7/10
Royal Arthur	3 years	L. H. Wakefield	Yorketown ..	3/8/10
Simulator II.	6 "	H. Haydock	Gawler	22/9/09
Sir Grainger	3 "	T. Drage	Laura	27/7/10
Sir Thomas	5 "	J. Dodd	Meningie	14/10/09
Spanker	4 "	J. N. Jacobs	Cowell	28/9/10
St. Elmo	7 "	A. Brown	Adelaide ..	14/9/09
True Blue	Aged	E. Denison	Balaklava ..	3/8/10
Van Tromp	5 years	R. J. Dennis	Crystal Brk.	7/9/10
Warrigal	4 "	E. L. Vorwerk	Yorketown ..	3/8/10
Warrior	4 "	G. Goldsmith	Yorketown ..	3/8/10
Whitehart	Aged	H. R. Raye	Yankalilla ..	5/11/09
Whitefoot	6 years	F. Starkey	Wilmington ..	20/9/10
Young Fisherman	5 "	G. A. McDonald	Orroroo	6/10/10
Young Workman	Aged	A. Boutell	Jamestown ..	5/8/10

PONIES.

Abdalla	9 years	J. C. O'Shea	Eudunda ...	29/9/09
Alexandria	Aged	Hon. R. W. Foster	Quorn	28/7/10
Australian Spy	5 years	J. L. Maxwell	Saddleworth ..	9/8/10
Australian Scout	Aged	Alfred Day	Mt. Barker ..	9/3/10
Black Prince	7 years	Mrs. A. A. McPherson ..	Penola	2/9/10
Blue Gum	Aged	W. Kinghorn	Mt. Gambier ..	20/10/09
Boatswain	"	G. Bermingham	Robe	22/9/10
Boliver	"	W. Richardson	Adelaide ..	15/9/09
*Bounding Willow	7 years	H. McCree	Yorketown ..	3/8/10
Brigand	Aged	M. J. Howard	Gawler	22/9/09
Cardo	3 years	Warren Bros.	Gilles Plains ..	6/9/10
Chumny	Aged	W. E. Lovell	Gawler	22/9/09
Commander	5 years	E. J. Banks	Robe	22/9/10
Commodore	Aged	O. Gaden	Mt. Gambier ..	20/10/09
Commodore	5 years	R. K. Kitto	Moonta	22/9/10
Crown Prince	3 "	Sir J. L. Stirling	Adelaide ..	14/9/10
Cymbell	5 "	W. R. Cross	Mt. Gambier ..	10/9/10
Cymro	4 "	W. H. Sombell	Petersburg ..	6/10/10
Czar Junior	5 "	Phil Brien	Bute	17/8/10
Dandy	4 "	N. Bodger	Snowtown ..	16/8/10
DeWet	4 "	E. C. Davey	Yorketown ..	3/8/10
Duke of York	8 "	W. E. Jacob	Kadina	30/8/10
Fireaway	Aged	C. C. Nitschke	Millicent	24/9/10
Foreigner	6 years	J. A. Jaensch	Murray Brdg.	23/3/10
Foreigner II.	7 "	W. A. Wilson	Naracoorte ..	26/8/10
Foreign Oak	8 "	Tom Duell	Eudunda ...	29/9/10
Foreign Prince	7 "	D. L. McEwin	Crystal Brk.	7/9/10
Freedom	4 "	J. F. Dodd	Adelaide ..	20/7/10

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
PONIES— <i>continued.</i>				
Furreed	Aged	Lisle Johnson	Saddleworth	8/10/09
Gay Warrior	3 years	Baker Bros.	Yorketown	3/8/10
General De Wet	6 "	Fisher Bros.	Bordertown	20/10/09
General Mac	Aged	J. H. McMorrow ..	Naracoorte	26/8/10
General Tracey	5 years	T. N. Skinner	Bordertown	20/8/10
Glenroy	Aged	August Traeger	Angaston ..	23/2/10
Glyndwn	"	Alex. McCulloch ..	Adelaide	13/9/10
Golden Eagle	4 years	A. E. Bienke	Bute	17/8/10
Guy	Aged	G. G. Mould	Strathalbyn	18/8/10
Happy Jack	"	A. Mackay	Mt. Gambier	20/10/09
Herd Laddie	"	F. Cooper	Balaklava	3/8/10
Hero II.	"	W. Downs	Millicent	27/10/09
Ingomar	7 years	C. Egill	Mannum ..	13/8/10
King Billy	7 "	T. J. Aston	Penola	13/10/09
King Cob II.	7 " off	J. Dennis	Adelaide	13/9/10
King Commodore	Aged	Wilson Bros.	Orroroo	6/10/10
King Edward	"	J. J. Fahey	Adelaide	14/9/09
King George	"	P. Charlie	Meningie	14/10/09
Kinglock	4 years	F. Leaney	Adelaide	13/9/10
Little Jack	3 "	W. Burrows	Mt. Gambier	10/9/10
Little Jap	Aged	H. Heaslip	Quorn	28/7/10
Little Toff	8 years	J. E. Linke	Balaklava	23/9/09
Little Warrior	Aged	H. Panell	Adelaide	14/9/09
Max	3 years	G. Gillen	Snowtown..	16/8/10
Maxwell	3 "	J. A. Jamieson	Snowtown..	16/8/10
Mickey	10 "	W. W. Bowell	Adelaide	14/9/09
Mick the Foreigner ..	7 "	H. W. Surridge	Balaklava	3/8/10
Midnight	Aged	T. H. Morris	Penola	13/10/09
Mischief	6 years	M. Sullivan	Adelaide	21/7/10
Moses	Aged	H. Beach	Adelaide	14/9/09
Noro	7 years	Capt. G. Walters	Adelaide	14/9/09
Nimble Dick	5 "	T. Rowe	Two Wells	6/10/10
Orion	Aged	F. Starkey	Wilmington	20/9/10
Paris	"	S. A. Wills	Balaklava	3/8/10
Paris II.	5 years	C. Edwards	Hawker	6/10/10
Peter	5 "	M. Rogers	Penola	13/10/09
Peter	8 "	Jas. Robertson	Naracoorte	23/9/10
Premier	3 "	P. Charlie	Adelaide	14/9/10
Prince Almont	5 "	J. M. Hammil	Laura	27/7/10
Prince Edward	7 "	F. Martin	Minlaton	10/8/10
Raff	6 "	E. Day	Mt. Barker	9/3/10
Rajah of Bong	7 "	J. P. Rooney	Bute	17/8/10
Raven	Aged	Jas. Williamson	Bute	17/8/10
Red Gum	5 years	J. W. Rackham	Penola	13/10/09
Robin Hood	5 "	F. F. Saint	Balaklava	23/9/09
Roman Rung	5 "	F. E. Fischer	Strathalbyn	18/8/10
Roman Warrior II. ..	6 "	E. Fuller	Wilmington	20/9/10
Rory o' More	Aged	A. Boute'l.	Jamestown.	5/8/10
Royal Ensign	3 years	E. E. S. Neumann ..	Murray Bdge.	23/3/10
Royalty	6 "	F. Richards	Adelaide	14/9/09
Royal Warrior	5 "	J. J. Fahey	Adelaide	9/7/10
Sanko	3 "	G. J. Atkinson	Cowell	28/9/10
Shooting Star	3 "	C. H. Angas	Adelaide	20/7/10
Silver Fish	4 "	W. J. Hobby	Jamestown.	5/8/10
Silver King	6 "	R. D. Tolmer	Naracoorte	26/8/10

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<i>PONIES—continued.</i>				
Sir Charles.....	6 years	J. and H. Hurst	Truro.....	7/9/10
Sir Garnet	4 "	D. Roberts	Adelaide ..	14/9/10
Sir James	8 "	M. J. Howard	Gawler	24/8/10
Smuggler	7 "	A. J. Berriman	Saddleworth ..	8/10/09
Tam o' Shanter	5 "	W. Tiller	Balaklava ..	3/8/10
The Duke	5 "	J. J. Fahey	Adelaide ..	14/9/09
The Duke	8 "	W. Wallace	Adelaide ..	15/9/09
*The Kafir	6 "	T. N. Skinner	Bordertown ..	20/10/09
The King	Aged	Mrs. W. E. Watts.....	Mt. Gambier ..	20/10/09
The Rising Sun	4 years	E. P. Polgreen.....	Cowell	28/9/10
The Sexton	Aged	G. Ganley	Hawker	6/10/10
The Toff	6 years	G. F. Way	Cowell	28/9/10
Tiberius	3 "	P. Charlie	Adelaide ..	14/9/09
Tim Whiffler	7 "	C. H. Boundy	Yorketown ..	3/8/10
Tipperary Lad	Aged	M. McCallum	Angaston ..	23/2/10
Titus	3 years	P. Charlie	Adelaide ..	14/9/10
Toff	8 "	J. P. Walker	Laura	5/8/10
Tommy Dodd	8 "	Jos. Malone	Adelaide ..	6/7/10
Tony the Second	Aged	W. Gammon	Penola	12/10/09
Victorious	"	J. McMorran	Lucindale ..	3/11/09
Vitellius	3 years	Philip Charlie.....	Adelaide ..	14/9/10
War Eagle	8 "	J. Reilly	Penola	13/10/09
Warlock	7 "	J. C. Scott	Mt. Gambier ..	3/9/10
Warringie	4 "	Stephens and McPharlane	Cowell	28/9/10
Warrior	5 "	Sir Saml. Way	Adelaide ..	14/9/09
Warrior	3 "	S. Hosking	Bute	17/8/10
Warrior Chief	Rising 5	J. J. Fahey	Adelaide ..	9/7/10
Wee Gibbie	6 years	A. J. Walkley	Adelaide ..	14/9/09
Welsh Lad	5 "	W. Fuller	Crystal Brk. ..	7/9/10
Young Black Toff	5 "	C. Graeber	Mannum	13/8/10
Young Fireaway	4 "	R. Marcus	Naracoorte ..	26/8/10
Young Orion	Rising 5	A. A. Harvey.....	Cowell	28/9/10
Young Souter	Aged	W. M. Secker.....	Lucindale ..	27/8/10
Young Texas	4 years	J. Cowan	Murray Bdg. ..	23/3/10
Zero	6 "	C. W. Flint	Penola	12/10/09

THOROUGHBREDS.

Ben Hur	Aged	Penny Bros.	Saddleworth ..	8/10/09
Blackfish	7 years	Duncan Campbell	Penola	12/10/09
Blackthorn	Aged	Hon. J. Lewis	Burra	19/8/10
Bright Light	7 years	J. and H. Hurst	Adelaide ..	20/7/10
Capitano	6 "	W. R. Michael	Barunga Gap ..	17/8/10
Carlinga	7 "	J. T. Whyte	Clove	28/9/10
Devlin	7 "	W. Burns	Gawler	24/8/10
Dil Moore	2 "	D. Feome	Crystal Brook ..	7/9/10
Duke of Richmond	Aged	W. A. Blacker	Adelaide ..	3/3/10
Emuam-na-Knuck	"	A. C. Coote	Port Elliot ..	27/10/09
Equilibrium	4 years	Crabb and Gregurkie ..	Cowell	28/9/10
Felix	7 "	W. Templer	Adelaide ..	13/9/10
Fulgurate.....	4 "	W. Potter	Bordertown ..	20/8/10
*Gambler Dick	5 "	J. and H. Hurst	Kapunda	7/8/10
Ganymedes	8 "	W. A. Blacker	Adelaide ..	3/3/10
Glen Eager	8 "	P. H. McEgan	Mt. Gambier ..	3/9/10
Good Morning Bill.....	Aged	A. Nichol	Balaklava ..	23/9/09
Isonomey	5 years	J. and N. Sullivan	Balaklava ..	3/8/10

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<i>THOROUGHBREDS—continued.</i>				
Juggler	11 years	W. R. Michael	Snowtown ..	22/9/09
*Juniper	Aged	Langley Bros.	Bordertown	20/10/09
King Edward	"	D. James	Kapunda ..	9/2/10
King Thor	6 years	A. M. Turner	Hawker	6/10/10
Kooringa	7 "	Hon. J. Lewis	Burra	5/10/10
Lord Agnopyn	7 "	Beattie Bros.	Cowell	28/9/10
Lord Euston	3 "	W. L. Watkin	Adelaide ...	2/3/10
Lord Thunderer	3 "	A. W. Schubert	Murray Bdg.	23/3/10
Macquarie	Aged	R. Ellery	Orroroo ...	6/10/09
Massaniello	"	F. Fawcett	Crystal Brook	6/9/10
Merry Monarch	8 years	C. Smidt	Quorn	28/7/10
Norback	6 "	A. Johnston	Eudunda ...	29/9/09
Orator	4 "	W. E. Mitchell	Laura	5/8/10
Overhaul	3 "	E. J. Winter	Eudunda ...	28/9/10
Pandion	3 "	G. Harris	Cowell	28/9/10
Prior Jun.	7 "	J. F. Miller	Tungkillo ..	13/8/10
Raven	Aged	J. O'Loughlin	Hawker ...	6/10/10
Resemblance	6 years	S. Stanby	Balaklava ..	3/8/10
Reynella	5 "	W. S. Day	Strathalbyn	22/10/09
Rheostat	8 "	J. Mulqueeny	Penola	13/10/09
Santoi	7 "	R. W. Herbert	Barunga Gap	17/8/10
Scrutiny	7 "	T. Arthur	Orroroo	6/10/09
Sir Robert	4 "	W. W. Warren	Adelaide ...	3/3/10
Sojourner	Aged	J. Mullins & Sons	Strathalbyn	22/10/09
Solitary	"	A. and G. McFarlane ..	Adelaide ...	3/3/10
Starlight	5 years	O'Leary Bros.	Hawker	6/10/10
*Straightshot	Aged	A. Boutell	Jamestown ..	5/8/10
Strathline	4 years	Jos. Quinlan	Balaklava ..	3/8/10
St. Vincent	Aged	H. Mentha	Gawler	22/9/09
The Admiralty	"	E. A. Wickens	Gawler	22/9/09
The Castaway	6 years	T. Kinnear	Moonta	29/9/09
The Nut	Aged	W. B. Parker	Cowell	28/9/10
The Tinman	4 years	W. Robertson	Wilmington	20/9/10
Thunder King	Aged	D. Shanwall	Wilmington	20/9/10
Tinbrook	2 years	W. L. Watkin	Adelaide ...	2/3/10
Toff	7 "	A. C. Hewton	Yorketown ..	3/8/10
Torah	8 "	W. R. Warren	Crystal Brook	7/9/10
*Trentbridge	Aged	E. Copping & Sons	Penola	12/10/09
*Whalebone	"	W. R. Cross	Mt. Gambier	10/9/10
Young Damper	8 years	C. J. Beckmann	Snowtown ..	21/9/09
Young Pishoage	6 "	J. H. Wilson	Two Wells ..	6/10/10

* Victorian Government certificate.

+ New Zealand Government certificate.

The report of the Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) with respect to the examination of stallions is as follows:—

I have the honor to submit the following report on the examination of stallions for soundness for the season ending August 31st, 1910:—

For the first period, viz., September 14th, 1909, to November 15th, 1909, the examinations were conducted on the morning of the show, and as several shows occurred on the same day, with the limited staff of veterinary surgeons (two) at command, the department was unable to arrange for the examination of stallions at all the shows of societies in accord with the Government scheme. The examination on the morning of the show

has many disadvantages, and owners expressed dissatisfaction with the arrangements. Horses were examined prior to judging, and at some shows the stallions were being examined whilst judging was going on, and, notwithstanding expeditious examination and issue of certificates to sound horses, confusion occurred.

The department at once recognised the necessity for special stallion parades, and in 1910 such parades were arranged and time-tables prepared. That the department's action has been justified the results of the season's work will show. Besides preventing the unsound stallions from competing at shows, the beneficent effects have had still greater reach—there is a growing tendency on the part of farmers and horsebreeders to patronise the certificated stallion, and stallion-owners themselves are now demanding Government certificates of soundness with all new purchases.

During the period ending August 31st 50 shows and parades were attended; 470 horses were submitted for examination, and of these 136 were rejected.

The following table will show the number of horses examined by the officers, with percentages of rejections, viz.:—

TABLE A.

Officers.	Number of Shows and Parades attended.	Number of Stallions Examined.	Number of Stallions Refused Certificates.	Percentage Refused Certificates
J. F. McEachran and C. A. Loxton in conjunction	13	174	46	26.4
J. F. McEachran	19	164	49	29.8
C. A. Loxton	18	132	41	31.06
	50	470	136	28.75

In Table B particulars are supplied respecting the number of stallions examined, the number in each class, and the number rejected:—

TABLE B.

	Draughts.	Lights.
Number examined	233 ..	237
Number rejected	98 ..	38
Percentage rejected	42.06 ..	16.03*

Table C gives an analysis of the unsoundnesses met with.

TABLE C.

Hereditary Unsoundness.	Draughts.		L. ghts.		Totals.	
	Number Affected.	Per Cent. Affected.	Number Affected.	Per Cent. Affected.	Number Affected.	Per Cent. Affected.
Ringbone	42	18.9	15	6.3	57	12.1
Sidebone	68	29.1	3	1.2	71	15.1
Bone spavin	1	.4	25	10.5	26	5.5
Curb	—	—	4	1.6	4	.8
Bursal enlargements ..	—	—	2	.8	2	.4
Unsound feet	3	1.2	1	.4	4	.8
Bog spavin and thoroughpin	1	.4	1	.4	2	.4

Amongst draught horses the unsoundnesses met with were principally sidebone and ringbone. The large percentage of draught horses with these imperfections clearly demonstrates that in the breeding of horses the farmer and horsebreeder has to be pro-

tested against himself. The high percentage is, no doubt, due to the influx of horses rejected in Victoria. In light horses certificates were withheld chiefly for bone spavin and ringbone.

TRANSMISSION OF DISEASE.

A review of the particulars supplied in connection with the pedigree of the stallions submitted (*vide* Regulation III., 1) enables us to provide evidence of direct transmission of hereditary unsoundness to the young stock of the unsound stallion, and several instances were noted.

BREEDING, TYPE, AND CONFORMATION.

Apart from the question of hereditary unsoundnesses in stallions, the attention of the examining officers was directed to a number of horses which were unquestionably unfit to be utilised for breeding purposes owing to poor standard as regards breeding, type, and conformation. Ponies and roadsters were the principal transgressors, but a few draughts of the mongrel class were also presented. The worthless, weedy stallion should also be dealt with in connection with the Government scheme of certification, and a regulation on lines similar to that in vogue in Victoria and New South Wales should be framed, whereby the examining officer will be able to disqualify stallions defective in type, breeding, and conformation. (A regulation on these lines has now been added to the regulations published last year.)

Too much care cannot be exercised in the selection of breeding stock. In Great Britain and Ireland horses are produced with special qualifications and strongly-marked characteristics. Working on systematic lines certain shires and districts are known for certain classes of animals—breeds the result of careful thought and study.

Instead of keeping to a proper system some breeders in Australia have been mixing their breeds, and, as a consequence, mongrels and weeds are the result. When a horse-breeder has chosen a certain class of horse to which to pay his attention he should stick strictly to that class or breed. Indiscriminate crossing will not improve old, well-established breeds. Breeding to pedigree ought, as far as practicable, to be followed. Freedom from hereditary unsoundness, action, good bone, and feet are all-important in all breeds and in both sexes. The quality of the brood mares is a matter of vital importance to the value of the product. Care should be taken in the choice of the mare. The best mares should be retained, and, in the export of mares from the State, only those which are not of first-class quality for breeding purposes should be disposed of.

In passing horses for Government departments it is found that a very large proportion of unsuitable horses are exhibited for sale. This is no doubt caused by farmers buying nondescript mares at small prices and mating them with cheap, unsound stallions.

The breeding of horses is now profitable, and the farmer should accept the guidance of the Government by breeding only from sound, well-bred animals.

STUD BOOKS.

The importance of breeding stock of good pedigree is now recognised by all progressive horsebreeders, and in New Zealand, New South Wales, and other countries we find that stud books are being kept. In New Zealand, especially in connection with Clydesdales, line breeding has been carefully followed up, with the result that dependence can be placed on the progeny. At the recent sales of New Zealand horses the excellent value secured was chiefly due to the fact that detailed pedigrees could be given of the breeding of both sire and dam. Unfortunately this practice has not been followed in South Australia. I think it would be a good thing for the State if stud books were in use. The Royal Agricultural and Horticultural Society—the parent society—which has done so much to improve the stock of the State, could possibly initiate the system.

VICTORIAN CERTIFICATES.

A large number of horses with Victorian certificates have been presented at shows and parades throughout the State, and, acting on Regulation IV. of clause 3, South Australian certificates were issued in lieu of them. I would respectfully draw your attention to the descriptions of horses given in some of the Victorian certificates. They do not correspond with the actual distinguishing points of the animals submitted. Uniformity of description is absolutely necessary; otherwise irregularities will arise which will have a detrimental effect on the whole scheme.

In connection with the Victorian Government system of certification of stallions, certificates issued during the season 1907-8 are life-certificates, and during season 1909 certificates for horses four years old and over are life certificates. As hereditary unsoundnesses may develop in horses until five years, and sometimes later, the question of a

re-examination of Victorian horses from five, six, and seven years old holding the 1909 and 1907-8 Government certificates is worthy of consideration. The arrangements as to tenure of certificates as set out in the Victorian regulations probably suited the requirements and exigencies of the moment, and provided for a gradual introduction of the system, but the recognition of unsound certificated animals (if any) from another State will not have a good effect on the system as a whole, and will certainly interfere with the attempt to eradicate the unsound, worthless sire.

LICENSING AND REGISTRATION.

The examination of stallions competing at subsidised shows is now being carried out in four States of the Commonwealth, viz., Victoria, South Australia, New South Wales, and Queensland. Doubtless Western Australia and Tasmania will soon fall into line. The existing system is not a perfect one—it possesses many disadvantages and anomalies; but it is necessary to bear in mind the difficulties in the way of more radical measures.

A uniform Licensing and Registration Bill is required—a Bill which will entirely exclude the unsound stallion and the weedy sire. Owners of certificated stallions and well-known horseowners favorable to the present system complain bitterly about the unfair competition of the cheap unsound horses, and the cry is becoming more prevalent. A vigorous repressive measure is required, and all the States in the Commonwealth should show a united front in the matter. It will be necessary for each State to pass a uniform Licensing Bill, making it compulsory for all stallions utilised for stud purposes to be certificated for soundness, and also approved for type, breeding, and conformation.



IRRIGATION OF LUCERNE.

(Continued from page 518 of December issue.)

WINTER-KILLING OF LUCERNE.

The winter-killing of lucerne is confined chiefly to the colder and more elevated portions of the Rocky Mountain region and to the northern belt of humid States. Damage from cold is rare in Arizona, and in California it is confined to young plants. In both the Sacramento and San Joaquin valleys of the latter State the seed is frequently sown in midwinter, and the slight frosts which occur occasionally in December and January in both these valleys are severe enough to kill very young plants. The belief is common that the plants are safe after they have put forth their third leaf.

In the colder portions of Montana, Wyoming, Colorado, Utah, and the Dakotas lucerne is apparently winter-killed from a variety of causes and sometimes from a combination of causes. The percentage of loss around Greeley, Colo., has been placed at 2 per cent. per annum. In this locality and throughout the Cache la Poudre Valley in northern Colorado most of the winter-killing is done in open, dry winters, and is quite generally attributed to a scarcity of moisture in the soil. In the winter of 1907 considerable damage was done to the lucerne fields around Loveland, Colo., on account of the long, dry spell in midwinter. The old lucerne fields suffered most. It was the opinion of the farmers that a late autumn irrigation would have prevented the loss.

Near Wheatland, Wyo., the higher portions of the fields suffer most damage in winter, and here also the cause is said to be lack of moisture in the soil, combined with the effects produced by cold and wind.

At Choteau, in northern Montana, a farmer watered late in the autumn part of a lucerne field which was two years old, and it winter-killed, while the unwatered portion escaped injury. This and other evidence along the same line which might be given go far to demonstrate that under some conditions too much moisture is as detrimental as too little.

Probably the chief cause of the winter-killing of lucerne is alternate freezing and thawing. The damage from this cause is greatly increased when any water is left standing on the surface. A blanket of snow is a protection, but when a thin sheet of ice forms over portions of a field the result is usually fatal to plants. The bad effects of alternate freezing and thawing on lucerne may be observed at the edge of a snow bank. This crop is likewise injured by the rupture of the tap roots caused by the heaving of the soil.

From present knowledge of the subject the means which may be used to protect lucerne fields from winter-killing may be summed up as follows : Where both the soil and the air are dry the plant should be supplied with sufficient water for evaporation, but the land should be drained so thoroughly that none of the top soil is saturated ; a late growth should not be forced by heavy irrigations late in the growing season ; if the soil is dry, irrigate after the plants have stopped growing, and the latest growth should be permitted to remain on the ground, ungrazed, as a protection.

It may be stated in conclusion that the loss to the farmer from the winter-killing of lucerne is not as great as might appear at first. The damage is done in the winter, and there is ample time to plough the plants under and secure another crop, which is usually heavy, owing to the amount of fertilisers added by the roots of lucerne. The Montana farmer who increased his average yield of oats from 50bush. to 103bush. per acre by ploughing under winter-killed lucerne illustrated this point.

SEEDING LUCERNE ON LAND TO BE IRRIGATED.

In Utah the most common practice now is to sow lucerne without a nurse crop. From 12lbs. to 18lbs. of Utah-grown seed is put in with a 6in. press drill to a depth of $\frac{3}{4}$ in. to $1\frac{1}{2}$ in. during the first half of April. Irrigation before seeding is not necessary as the soil is usually moist and contains sufficient moisture to support the plants until they attain a height of 6in. to 10in. At this stage the lucerne and the weeds are cut about 4in. above the surface, the cutter bar of the mower being raised for that purpose, and the cuttings are left on the ground. Water is kept off after cutting until the crop begins to suffer. It is believed that when young plants lack moisture they will strike their taproots deeper into the soil in quest of water, and in this way develop a better root system than they would under frequent and copious irrigations. When lucerne is sown with a nurse crop oats is preferred. From 10lbs. to 15lbs. of lucerne seed is sown with 3 pecks to 1bush. of oats.

In the upper Snake River Valley, in Idaho, lucerne is usually preceded by a grain crop. The stubble is ploughed 6in. to 9in. deep in the autumn, and early in the spring it is double-discd, harrowed, and smoothed. From 8lbs. to 20lbs. of seed is then drilled in $\frac{3}{4}$ in. to $1\frac{1}{2}$ in. deep in rows 6in. apart. When oats is used as a nurse crop it is seeded first, 80lbs. to 100lbs. per acre being used. From 8lbs. to 12lbs. of lucerne seed are then drilled in in the opposite direction. Some farmers use a combination drill which seeds both at the same time. When no nurse crop is used the lucerne plants are clipped when they reach a height of 8in. to 12in. This is necessary to hold the weeds in check and to cause the plants to stool.

In the Yakima Valley March and April are preferred for seeding lucerne, both on account of the climate and the abundant water supply of that period.

The ground is ploughed deep, graded, smoothed, and harrowed. From 10lbs. to 20lbs. of seed are then put in with a broadcast seeder and harrowed lightly. The furrows are then marked off and irrigation begins. The ground is kept moist constantly until the young plants are fairly well established. The use of so much water at the start is due largely to the tendency of the soil to bake if allowed to become dry.

The lucerne-growers of Montana are about equally divided in opinion as to the advantages of using a nurse crop. Those who seed grain with lucerne claim that they get more out of the land the first season, while those who are opposed to this practice believe that the injury done to the lucerne plants by the grain crop extends through several years, and that the small gain of the first year is more than offset by the lessened yields of lucerne in subsequent years.

In northern Colorado rotation of crops is practised, and lucerne seed is sown with a nurse crop, usually wheat or barley. The seed is drilled early in the spring with a common force-feed press drill equipped with an auxiliary seedbox for lucerne seed, which is scattered broadcast between the grain rows and covered by the disc wheels of the press drill. From 12lbs. to 20lbs. of lucerne seed are sown. Irrigation before seeding is not practised. There is, as a rule, sufficient rainfall to furnish both crops with moisture until the grain is ready to head out and the lucerne is 4in. to 6in. high, when the field is irrigated.

At Wheatland, Wyo., various methods of seeding lucerne are in use, but the one which gives the best results may be described as follows:—Drill in 1bush. of barley to the acre; then in a week or 10 days cross drill the field, sowing 12lbs. to 15lbs. of lucerne, setting the press drill so that the seed will be covered $\frac{3}{4}$ in. to 1 $\frac{1}{2}$ in. deep.

In Yuma and other valleys of Arizona October planting is preferred. Frequently in this dry climate the land is irrigated before being seeded. It is cultivated, then seeded and harrowed. In the dry-planting method the seed is sown broadcast on the dry soil, harrowed lightly with a brush drag, and then irrigated. A second irrigation is necessary in about eight days to break the surface crust.

In California the treatment given to lucerne in the first stage of its growth varies somewhat with the locality. In Kern County the seed is sown from December to April inclusive, with a preference for February and March seeding. If the soil is dry it is first irrigated. In the Modesto and Turlock districts more or less seeding is done throughout the winter months, but the greater part is seeded in March and April, just before the dry season begins. From 30 acres to 40 acres can be seeded in a day with a hand broadcasting machine if the operator sits in the back of a wagon which is driven over the field. Eighteen pounds of seed to the acre is the average amount sown.

RISE OF GROUND WATER AND ITS EFFECTS ON LUCERNE.

In their natural state the typical soils of the arid region are characterised by the depth of water and their looseness and dryness. The diversion and use of large quantities of water in irrigation soon change some of these natural conditions. A part of the flow in earthen channels escapes by seepage, and still larger quantities percolate into the subsoil from heavy surface irrigations. The waste water from these and other sources collects in time at the lower levels and raises the ground-water level. This rise is usually noticed first in wells, a permanent rise of 5ft. in a year being not uncommon.

This rise of the ground water is an advantage, provided the water table does not rise too high. It lessens greatly the cost of sinking wells, less water is needed in irrigation, and it furnishes a reservoir from which water can be pumped to supply other lands.

It is not until the water-level encroaches upon the feeding zone of valuable plants that its injurious effects are felt by the farmer. Its near approach to the surface may prove so disastrous that its upward trend should be noted with the greatest care. Perhaps the best means of providing for such observations is the use of test wells, referred to on page 37.

There is some difference of opinion as to what depth below the surface marks the danger line for lucerne. It has been shown by Doctor Loughridge, of the University of California, and by other soil physicists, that water may be withdrawn by capillarity from soils to depths varying from 4ft. to nearly 5ft., depending on the character of the soil. This fact has an important bearing on the subject, because when the ground water is brought to the surface and evaporated the salts held in solution are deposited at or near the surface. If these salts contain much sodium sulphate, or even sodium chloride, all of which are usually grouped under the common term alkali, the crust formed by them will in time destroy the lucerne. It may be stated, therefore, that when alkali is present in harmful quantities in the ground water it should not be allowed to rise nearer than 4ft. below the surface.

The percentage of harmful salts in the ground water is usually determined by the chemist of the nearest agricultural experiment station, but when an accurate test cannot be made in the laboratory, the farmer may make a practical test in the following manner, in accordance with a suggestion made by A. T. Sweet, of the Bureau of Soils of this department.

Take three pots containing equal amounts of soil and plant the same number of grains of wheat in each. Water each pot with equal quantities of water. In No. 1 apply fresh water, in No. 3 ground water, and in No. 2 an equal amount of each kind. The injury, if any, caused by the ground water will be indicated by the longer time required for the plants to appear above the surface, the smaller number of plants to germinate, and their general appearance.

In soils free from alkali but saturated with water there is not the same necessity for holding the ground water continuously below a so-called danger line. In parts of Kern County, Cal., the ground water sinks to 8ft. below the surface of lucerne fields in summer, but rises to within 1½ft. of the surface in winter. There is no indication of root rot, and the plants have retained their full vigor. Numerous cases might be cited to show that the rise of water to within a foot or two of the surface for comparatively short periods of time does little injury to the plants. On the other hand, wherever water stands continuously during the irrigation season within a few feet of the surface it is pretty certain to kill lucerne in three years or less.

THE INJURIOUS EFFECT OF SILT ON LUCERNE AND THE BENEFITS TO BE DERIVED FROM DISCING.

The silt-laden waters of the rivers of the South-West during periods of high water in time form a crust over the surface of irrigated lucerne fields. The soil formed by such rivers is naturally impervious, and when a coating of fine sediment is deposited around the plants the effect is injurious, particularly to young plants, which may be killed as a result, notwithstanding the fertilising value of the silt. In irrigating with water carrying much silt the larger and heavier particles are deposited in the channels which convey the water from the streams, while the finer and lighter particles are carried to the fields. These fine particles cement together and form so hard a crust when dry as to exclude both air and moisture from the soil.

Engineers may in time devise a practical remedy for this evil by building settling basins and storage reservoirs, but at present the tendency of many officers of canal companies is to increase the grade of the channels so as to carry the greater part of the silt to the fields. This does not solve the problem, it merely shifts the burden to the water users. To such, discing the surface at the proper time has proved the most efficient remedy. An effort is made to secure well water or clear ditch water while the lucerne is young and later to counteract the bad effects of muddy water by the free use of the disc.

Discing lucerne is quite generally practised now throughout the West. It is generally done in the spring as soon as the ground is hard and firm, and before the growth has started. When a field is disc'd a second time in the same season it is done when the stubble is short, just after the removal of the crop. The discs should be set nearly straight so as to stir but not overturn the soil. The spring-tooth harrow is used also, but its tendency is to tear up the ground too much. Perhaps the best implement for this purpose is the spike disc harrow or lucerne renovator, as it is sometimes called, in which spiked wheels are substituted for the ordinary concave discs.

Discing not only breaks up the impervious layers formed by muddy water, but it splits the old root crowns, thickens the stand, destroys weeds, checks

evaporation, and mixes the dead leaves of previous crops with the top layer of soil.

PASTURING IRRIGATED LUCERNE.

Only a small part of the total acreage in lucerne is pastured throughout any one season, but a large part is pastured during short periods, usually in the autumn. Since the plants are easily injured and killed by stock when the ground is wet and soft, stock should be kept off for a time after irrigation. On this account it is a good plan to have the pastures fenced into three equal parts and pasture but one at a time. The inclosures should be alternately pastured, irrigated, and the stand allowed to reach a height of 8 in. or so before stock is turned in again.

PRODUCTION OF LUCERNE SEED UNDER IRRIGATION.

The large area which is seeded to lucerne each year creates a demand for lucerne seed. Good seed is grown now in every irrigated State in the West, and the contention that it cannot be produced successfully under irrigation is unfounded. The use of too much water is doubtless the cause of many failures. Any one of the crops may be saved for seed, but it requires about twice as long to produce a seed crop as it does a hay crop, owing to the extra length of time required for the seed to ripen, and the different crops do not yield equally well. The more general custom is to save the second crop for seed, and where this is done it is recommended that the first crop be irrigated as usual for hay, and that water should be applied very sparingly, if at all, to the seed crop. Where the same amount of water is used as for hay the growth is rank and rapid, and hay rather than seed is produced.

PROFITS TO THE IRRIGATOR.

The feeding value of lucerne is so high that the greatest profits can be obtained usually by feeding it to farm animals. When sold in the stack the net profits vary between somewhat wide limits. From the three tabulated statements which follow some idea may be given of the profits to the grower under skilful practice.

Profits from Lucerne-growing.

YAKIMA VALLEY, WASH.—		£	s.	d.	£	s.	d.	
•	Annual cost of water per acre	0	6	0				
•	Cleaning and repairing farm ditches	0	2	0				
	Annual taxes	0	3	0				
	Cost of applying water during the season	0	14	0				
	Cost of harvesting and marketing seven tons at 8s.	2	16	0				
	Annual depreciation of hay tools, irrigation structures, &c.	0	4	0				
						4	5	0
	Average yield of seven tons, at £1 8s.					9	16	0
	Annual profit per acre					5	11	0

Annual interest on investment 22·2 per cent., on a basis of land and water right valued at £25 per acre.

PARMA AND ROSWELL DISTRICTS, IDAHO—

	£	s.	d.	£	s.	d.
Annual cost of water per acre.....	0	2	0			
Cleaning and repairing farm ditches	0	1	6			
Annual taxes.....	0	2	6			
Cost of applying water during season	0	6	0			
Cost of harvesting and marketing seven tons at 7s.	2	9	0			
Annual depreciation of hay tools, irrigation structures, &c.	0	4	0			
				3	5	0
Average yield of seven tons, at £1 per ton				7	0	0

Annual profit per acre 3 15 0

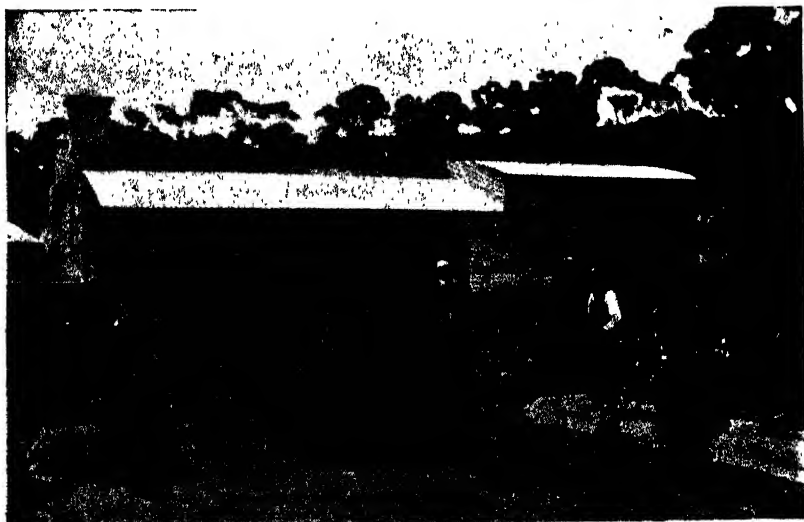
Annual interest on investment 18·75 per cent., based on land and water right valued at £20 per acre.

SAN JOAQUIN VALLEY, CAL.—

	£	s.	d.	£	s.	d.
Annual cost of water per acre.....	0	7	8			
Annual cost of applying water per acre	0	8	10			
Cleaning and repairing farm ditches	0	2	0			
Annual taxes.....	0	4	0			
Cost of harvesting and marketing seven tons at 8s. per ton.	2	16	0			
Annual depreciation of hay tools, irrigation structures, &c.	0	4	0			
				4	2	6
Average annual yield of seven tons, at £1 8s. per ton				9	16	0

Annual profit per acre 5 13 6

Annual interest on investment 16·2 per cent., based on land and water right valued at £35 per acre.



SETTLER'S HOME ON THE MURRAY.

STOCK DISEASES.

REPORT OF THE STOCK DEPARTMENT.

The following extracts are taken from the annual report of the Chief Inspector of Stock:—

WORMS IN SHEEP.

“Lung worms (*Strongylus filaria*) have again caused much serious trouble to flockowners, and, what is worse, have again made their appearance in the Central District. Owners should bear in mind how difficult it is to eradicate this parasite from a farm that is once infected—for dry embryos may be scattered everywhere—and should be careful what sheep they purchase. Much can be done, however, by preventive measures. The water supplied to the sheep should be pure, and from sources that cannot become contaminated. Owners must remember that the better the sheep are fed the better they will withstand the ravages of the parasite, and sheep must not be kept on pastures where they have to bite close to the ground. Licks of salt and sulphate of iron should be provided in troughs in the sheep paddocks. Treatment is of much service, but is generally resorted to too late. Medicines can be administered by drenching, by fumigation, and by tracheal injections. Owners who have this trouble in their flocks should communicate with the nearest inspector of stock, and to the Chief Inspector of Stock, Adelaide, when they will receive advice and assistance.

FLUKE.

“In the South-Eastern District this disease has been prevalent in some of the pastures, and another farm became infected in the Central District, and about 50 sheep were lost. Owners must remember that it is not worth while treating sheep badly infected with fluke, the death rate is so high. Preventive measures are, however, of much value. Salt will kill the fluke worm, and dressings of lime and salt should be spread over infected pastures, and licks of salt and sulphate of iron should be provided. Over-stocked undrained pastures are the great source of infection. The closer a sheep grazes to the dirt the more fluke worms the animal will become infested with. Although sheep cannot be completely cured, the judicious use of sulphate of iron and common salt will improve the condition of animals not too badly infected.

“Stomach and intestinal worms have caused much trouble, and salt and sulphate of iron licks should be provided in our sheep paddocks. The addition

of turpentine to licks—in very small quantities at first, so as to gradually get the sheep used to it—has been found of much service in keeping worms of all kinds out of flocks.

PLEURO-PNEUMONIA.

“Again I have to report the State very free from this disease. Out of 16,605 head of cattle slaughtered at the City Abattoirs only three were condemned for pleuro-pneumonia.

“A mob of uninoculated cattle from Queensland introduced the disease, but they were seized, quarantined, and inoculated, and owing to the prompt action of the staff the loss to owners was comparatively small, as, out of nearly 300 in-contact cattle, only 12 head were destroyed or died suffering from the disease, and the cattle will shortly be released. Again the value of inoculation carried on systematically in Queensland and the Northern Territory has been of immense value to this State, and it is only when some careless owner neglects the opportunity to inoculate that an outbreak occurs, or, as sometimes happens, the virus used has lost its vitality; but it is to be feared that the carelessness on the part of owners and drovers may at any time bring about a serious outbreak of disease.

TUBERCULOSIS.

“I am glad to be able to report a diminution in the number of tubercular cattle dealt with by the staff as compared with last year. The number found suffering from the disease was 175, viz. :—95 dairy and 80 other cattle; of this number one died, 163 were destroyed, and 11 were isolated for further examination. The number of cattle condemned at the City Abattoirs was 109, giving a total number of tuberculous animals dealt with of 284.

ACTINOMYCOSIS.

“The number of cattle found by the staff to be suffering from this disease was 98, viz. :—53 dairy cattle, and 45 other cattle; 58 were destroyed, 40 were isolated for treatment, of which number 17 recovered under treatment.

CANCER.

“The inspecting staff found 39 head of cattle suffering from cancer, and they were all destroyed.

PARALYSIS (SO-CALLED “DRY BIBLE”).

“Not nearly so many cattle suffered from this disease as during last year, the number being 125, viz. :—114 dairy cows and 11 other cattle, showing a decrease as compared with the previous year of 231.

CONTAGIOUS ABORTION.

“It is much to be regretted that two outbreaks of this disease took place; but the measures adopted by the staff were most satisfactory. One outbreak has been stamped out and the other is now in hand, and no doubt will soon be dealt with in a similarly successful way.

YACCA POISONING.

"A number of cattle are lost annually from this cause, and in the South-Eastern, Southern, and Port Lincoln districts this trouble is very often confused with paralysis (dry bible), though the symptoms are utterly dissimilar. Great care should be taken how cattle are kept on yacca country, especially after it has been burnt, when cattle will readily eat the young shoots, which have a toxic effect.

CATTLE TICK (TICK FEVER).

"No serious loss from tick fever has been reported; a number of valuable bulls, however, travelling from Western Queensland to the Victoria River became tick infested, and a considerable number were lost from tick fever. Precautions should be taken in the event of valuable stud stock travelling north to improve the herds in the tick country. The animals should be vaccinated before starting, to render them immune to the disease. Many of the cattle travelling south were tick infested, and were dipped."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.), reports as follows:—

CEREBRO-SPINAL MENINGITIS.

"The disease cerebro-spinal meningitis in horses is certainly one which demands a very thorough investigation, and it is unfortunate that, owing to other duties taking up so much of our time, we were unable to conduct feeding and inoculation experiments. The mortality is extremely high, and as horses are now very valuable a special effort should be made to discover the toxic agent which causes the disease. The preventive measures recommended, viz., cessation of feeding with the damaged fodder, removal of remaining horses to another part of the farm, and disinfection of premises, have been successful in each instance, and justifies us in attributing the cause to the ingestion of damaged forage, *e.g.*, mouldy and musty hay or ensilage. The disease has been investigated in the United States of America and in Victoria, and the same cause attributed as in this State. Outbreaks of the disease occurred at Mallala, Balaklava, Warnertown, Wasleys, Adelaide, Moockra, Tumby Bay, and Monarto South.

Symptoms Observed.

"There may be no premonitory symptoms. The horse appears stiff, and giddiness or staggering may be present. Swelling of the lips is common, with salivation, the discharge being glairy in character. Mucous membrane of eyes injected; nostrils congested, with hæmorrhagic spots (petechiæ). In early stages pulse and respirations are normal, but in later stages the pulse and respirations are increased, and as death approaches pulse becomes irregular and intermittent. There is no rise of temperature. The paralytic

symptoms come on suddenly. There is a total loss of motor-power, the horse falls prostrate to the ground, and is unable to rise without assistance. In the majority of the cases there is inability to swallow, which is very prominent in severe cases. In two cases the horses seemingly had appetite, attempted to masticate, but were unable to swallow. Owing to the animal being unable to swallow he presents a loathsome and pitiful appearance; he roasts his head on nearest obstacle, feed-box, bucket, &c.; endeavors to masticate food or drink water; tongue protrudes, lips becomes pendulous, and a mucu-purulent discharge exudes from eyes and nostrils. Rapid wasting takes place, and horses in good condition attacked with this disease in its acute character very quickly become emaciated. Bowels may be constipated and urine suppressed. In one instance the urine was dark-colored. Before death horse is semi-comatose and pulse is imperceptible.

Post-mortem Appearances.

"The principal *post-mortem* appearances are large increases of fluid in brain and spinal cord—this is a constant condition. Diffuse inflammation of mucous membrane of stomach; inflammation intestines, with well-marked hæmorrhagic spots (petechiæ) in cæcum and colon; congestion liver and kidneys; spleen normal; lungs normal; petechiæ also observed in pleura and larynx.

STRANGLES.

"During the year this disease has been extremely prevalent, in some cases causing loss; the losses, however, being due to the treatment adopted by some of the owners. A number of cases of irregular strangles were observed—a tendency to abscess formation in different parts of the body; and Mr. Loxton and I had to operate on several horses affected in this way. I attribute the severity of the attacks to careless treatment and the insanitary condition of stables and yards.

ENZOOTIC PARALYSIS IN CATTLE.

"In investigating a few cases of this disease amongst dairy cattle in the State I was much impressed with the success obtained by adopting the preventive measures recommended by the department, viz.:—Feeding with wholesome nutritious food, *e.g.*, bran and chaff, boiled wheat and barley, and the systematic administration of bonemeal and salt.

CONTAGIOUS OPHTHALMIA IN CATTLE AND SHEEP.

"This disease is common in South Australia, and some serious outbreaks have been encountered. The disease is due to a specific virus (not yet isolated) and is very contagious. Flies and other insects play an important rôle in disseminating the disease. The first symptoms are watery discharge from

eyes, irritation, discharge becomes muco-purulent, and opacity and ulceration of cornea may result. In the early stages the disease is easily cured by isolating animals and dressing eyes with a simple eye lotion, *e.g.*, sulphate of zinc, 6 grams; laudanum, 30m.; water, 2ozs. When a white scum appears over the eye it is necessary to touch it once only with caustic stick (nitrate of silver), and afterwards use a solution of silver nitrate (3 grams to the ounce). Owners report that these remedial measures are highly successful, the disease being completely stamped out.

CONTAGIOUS DISEASES OF SWINE.

"An outbreak of pasteurellosis in young pigs occurred on both sides of the Murray. Isolation, strict cleanliness, and disinfection of premises (especially before sows litter) were the measures recommended, and evidently were successful, because no further cases have been reported from these districts.

"A form of swine septicæmia, with fever of a relapsing character, was also seen amongst a large number of pigs kept under very insanitary conditions in the Windsor district. The pigs were wallowing in filth and were very lousy. The disease was assuming an epidemic form, but removal of the pigs from their filthy surroundings checked it. Microscopic examination of the blood revealed the presence of a particular organism; but, owing to pressure of work, investigation work had to be abandoned. Owners of swine who wish to prevent the introduction of swine fever and other diseases amongst their pigs must attend to the general structure of sties and paddocks; in fact, in inspecting pigs in the metropolitan area the veterinary officers came across some very insanitary premises. The attention of the health authorities should again be directed to the condition of pigsties generally throughout the State. It is a matter of very great importance."



LUCERNE, THE GREAT NATURAL RESTORER OF SOIL FERTILITY.

BY S. McINTOSH, Superintendent Reclamation and Irrigation.

The havoc caused by takeall this season amongst the wheat crops throughout the greater portion of the farming areas of the State is causing many of our more progressive farmers to reason that after all there may be such a thing as wheat lands becoming super. and wheat sick; also, bare summer fallowing and continuous wheat cropping, with constant application of superphosphates, may in the end render some of the best of our soils comparatively sterile. A practical scientist of world-wide repute in the matter of intense culture a few years ago informed the writer that he was convinced the average Australian farmer who closely followed the system of bare fallow, wheat and super., was practically existing on his capital account if he intended to permanently occupy his land, and that unless he modified his programme the end would be possibly disastrous.

The same authority writes—“The soils of the Goulburn Valley have been seriously injured for irrigation by grain-growing and summer fallowing. The grain has taken out nitrogen and the fallow has burned out the humus. No more exhaustive or ruinous system of cultivation for an irrigation district could be devised.” The system condemned is similar to one practised here, and I contend the same arguments apply in this case. The first principle in irrigation practice is, “allowing a maximum crop requires a given quantity of soil moisture to bring it to maturity, in the event of the natural rainfall falling short of such requirements the balance must be supplied by artificial means at the proper time when required by the plant, to secure the maximum crop yield.” Takeall is most noticeable in a good year, when the greatest demand is made on the plant foods.

Practical and scientific demonstrations have long since proved that the bulk of our soils are deficient in phosphates; but the constant application of the latter, year after year, to the exclusion of every other necessary plant food, must ultimately result in the whole available natural supply of such plant foods becoming exhausted.

Rotation of crops, with the judicious use of mixed manures, is the first and soundest doctrine amongst all civilised agricultural communities. In no other country in the world is such a system to be found as obtains here; and that in itself, in view of the antiquity of agriculture, should provide ample food for thought at the present juncture.

The cause which brings takeall into evidence has not yet been satisfactorily determined, but the fact of it being usually worst on soils of a sandy nature

which have been fallowed and cropped when dry indicates the possibility of the lack of some plant constituent necessary to the full development of the cereal. Further, where a rotation of crops system is practised the ravages of the scourge are not nearly so drastic as on land which has been regularly fallowed and cropped with wheat for years past.

Agreed that a rotation crop system is the correct one, we naturally ask ourselves what crops our average lands are suitable for, and whether or not the market value of such prospective crops will warrant the cost of labor and marketing. The majority of our producers are farmers, and in a lesser degree graziers and dairymen; therefore any improvement in soil pastures is desirable. Now, with a fairly extensive practical knowledge of this State, with the exception of the country south of Bordertown, I feel convinced that, provided the soil is properly worked and seed sown under favorable conditions, there is no plant likely to assist the cultivator in improving both his soil fertility and his banking account to the same extent as lucerne. Wherever this wonderful plant is grown it is held in the highest esteem as the "king of fodders."

In America we are advised that "alfalfa solves all problems of clearing the soil from foreign growths, and is a great fertiliser. It enriches the soil in which it is grown by draining nitrogen from the air and storing it in the roots. It replenishes the soil with the very qualities upon which grain places the greatest tax."

Its long and searching root system penetrates to great depths and brings to the surface plant constituents which cannot be secured by any other known factor.

The public are just awakening to the true value of this wonderful plant, and there is likely to be much greater demand for seed than even exists at present. Tens of thousands of acres of land in South Australia crying out for a change of treatment will grow highly profitable crops of lucerne and produce some of the finest seed grown in the world. Provided the strain is a good one, I would willingly give 6d. to 1s. per pound for guaranteed South Australian grown seed in preference to any other commercial variety. I have never seen it fail either in germination or crop yields.

A stand of lucerne is usually three or four years old before it is left for seed. In the meantime it is grazed or cut as its volume warrants.

As comparatively few of the interested public have the opportunity of studying Coburn, the standard authority on lucerne, I cannot do better than quote his chapter on "Alfalfa in Crop Rotation."

"MAINTAINING FERTILITY.

"It is a fundamental principle of the best agriculture that every acre should be kept constantly at its highest productive capacity. In one sense the farm is a great machine for the production of food. All prosperity must

originate on and emanate from the farm; the farmer is really the only original producer. The measure of the world's material success must be the relative amount of the product of the farm. As lands decrease in fertility, the cost of living increases in direct proportion. As fertility decreases, land values decrease and rural population decreases. Already there are districts in America that are almost depopulated because of the barrenness of what was, but a short while ago, fertile land.

"The fundamental principle of maintaining fertility is to restore to the land annually those chemical elements taken from it by the crops grown. A prominent importer of horses relates that he was once entertained on a great horse farm in France, whose owner told him that much of the farm had been in cultivation for over 800 years and was, he believed, as productive now as ever in its history.

"Alfalfa ranks as the greatest fertilising plant known to scientific agriculture. All cereal crops use large quantities of nitrogen. A field cropped for years in corn or wheat will come to have too little nitrogen for the production of a profitable crop. Alfalfa, as has already been stated, after the first few months of its life, obtains its whole supply of nitrogen from the air; in fact, more than it really needs. As a soil improver it possesses at least five valuable properties.

"1. It gathers nitrogen from the air for its own maintenance and a surplus that is constantly being added to the soil.

"2. It is a deep feeder, and its roots penetrate the earth to extraordinary depths, drawing toward the surface and utilising moisture and valuable mineral elements that other crops would never reach, leaving the desirable elements there for future crops, of whatever kinds.

"3. By capillarity these roots and rootlets draw up moisture from below the surface until it modifies the very top soil, changing wonderfully the nature of the field. The analysis of a cubic foot of earth of a flourishing alfalfa field shows a marvellous change in moisture content since the sowing.

"4. The mere mechanical effect of the extensive root system can scarcely be over estimated. As soon as germination begins, the plant starts its tiny roots downward on the search for moisture. Roots 4ft. long have been found on alfalfa but four months old; roots 9ft. long have been found below alfalfa but nine months old. After the taproot reaches a few inches below the surface it sends out smaller roots that have a lateral growth of but a few inches, when they too take a downward course for moisture and for mineral elements needed for the growth above. These first smaller roots decay, and others start out from the taproot lower down. These decay and still others start. The decaying roots add humus to the soil, and the openings left by them form a wonderful system of channels for the penetration of air and water into the soil. The erstwhile compact earth is honeycombed, and the air and water penetrate the graves of the dead roots until, when the

alfalfa field is ready to be used for a different crop, the soil has been wonderfully changed, not only in its chemical elements, but in its physical character.

" 5. The regular deposit of alfalfa leaves from the cuttings, under the best care, has been estimated at one-half ton or more per acre every year. As these leaves contain a great percentage of protein, it can readily be seen that they make a heavy contribution to the soil's fertility.

" VALUE OF STUBBLE AND ROOTS.

" When in his system of rotation the farmer is ready to plough up his alfalfa, he has another inestimable contribution to the land's fertility in the stubble and roots. It is not recommended to plough under any considerable growth as a green manure, as the hay crop is too valuable. Its market value would buy more fertilisers than the same growth is worth for humus. After a field has stood for five or six years the roots have added largely to the humus content. Professor W. P. Headden, of Colorado, estimated that the fertilising value of the stubble and 6½ in. of roots ploughed under is about 20 dollars (£4) per acre, while the value of the stubble and entire root system is not less than 35 dollars per acre.

" The New Jersey Station estimated that the amounts of plant food gathered by an acre of alfalfa in two years were equivalent in nitrogen to that contained in 3,500lbs. of nitrate of soda; in phosphoric acid to that contained in 600lbs. of bone black superphosphate; and in potash to the amount contained in 1,200lbs. of muriate of potash, or equal to what would have cost 124 dollars.

" EFFECTS ON SUCCEEDING CROPS.

" The Wyoming Station, at Laramie, under direction of Professor B. C. Buffum (Bulletin No. 44), made some tests that proved the market fertilising value of alfalfa. A plot of ground that had been in alfalfa for five years adjoined a plot of the same size that had been in varied crops—wheat, oats, potatoes, &c. After the alfalfa sod was broken the two plots were prepared together and planted crosswise to wheat, oats, and potatoes, with half of each on the broken sod and half on the other plot, with the following yields and gains :—

	After Alfalfa.	After Other Crops.	Money Gain.
	Bush.	Bush.	Dols.
Wheat	30	18	8 to 12
Oats	78	37	16
Potatoes	81	52	16

"Stating the results in another way, Professor Buffum says—

" 'The value of alfalfa harvested from half an acre of land for five years was about 50 dollars more than the cost of producing it.

" 'The value of potatoes and grain from an adjoining half-acre for five years was about 44 dollars more than the cost of producing, at local prices.

" 'When the alfalfa half-acre was ploughed and planted to wheat it produced 8 dollars to 12 dollars more value in wheat per acre than the land which had grown potatoes and grain before.

" 'When the alfalfa half-acre was ploughed and planted to oats it produced 16 dollars worth of grain more than land which had grown potatoes and grain before.

" 'When the alfalfa half-acre was ploughed and planted to potatoes it gave 16 dollars worth more of potatoes per acre than was obtained from land which had grown potatoes and grain before.

" 'By growing alfalfa the increase of yields and values were produced with absolutely no cost for fertilising the land.'

" This gain, it will be noted, cost nothing in the way of fertilisation, as the alfalfa had every year been more profitable than the other crops. A Marion county, Kansas, manager of large estates, reports that a field of wheat after alfalfa averaged 40bush. per acre, while an adjoining field of equal original fertility averaged but 15bush. These results have been duplicated in innumerable instances where alfalfa fields have been ploughed and planted to other crops. A Colorado man who farms 1,000 acres, with 200 acres of it in alfalfa, says he cannot afford not to plough his alfalfa after he has had from it four years' crops; that it is necessary to maintain the general farm fertility and obtain big crops of corn, oats, and potatoes. In the potato districts of Colorado alfalfa is used systematically as a rotation to maintain the yields and quality of their potatoes, both of which are so famous.

" In the corn belt, which may be said to extend from the central meridian of Kansas to Pennsylvania, alfalfa used in rotation will do much to prevent the disgrace of raising an average of but 20bush. or 25bush. of corn to the acre. And so, in what were once famous wheat belts, alfalfa will restore the crop records if properly used in a rotation.

" ROTATION A NECESSITY.

" Some experiment station men insist that where alfalfa is allowed to stand for many years it will cease to have a fertilising value; that alfalfa draws heavily on the potash and phosphoric acid in the soil, and will after, say, eight or 10 years begin to deplete it of these important elements. Therefore they insist that alfalfa should not be allowed to stand for over six or eight years unless it is given an annual top dressing of manure. They favor ploughing up the alfalfa after about five years and cropping to corn or cotton.

"Former Governor Hoard, in speaking of the value of alfalfa as compared with that of clover in a crop rotation, says that, 'alfalfa, having a much larger root development, goes deeper down, thoroughly subsoils the ground, brings up phosphorus and potash from the lower strata, and leaves much more vegetable matter to decay and furnish humus. Nothing else we have ever tried equals alfalfa for putting the soil in good tilth.'

"SPREADS THE BACTERIA OVER THE FARM.

"Men who are raising alfalfa for use in a regular rotation never leave it over six years; many prefer five, while others make it a rule to plough up their fields every four years. Thus the bacteria becomes fixed in the soil of the whole farm. Such farmers use alfalfa as they formerly used clover, to restore fertility needed for profitable crops of grain, hay, and forage.

"The sod is hard to plough. It is well to do the breaking immediately after the season's cutting, if possible. Disc and harrow it several times, and sow to rye for winter pasture, and plant to corn or cotton or potatoes in the spring. The winter's freezing will help to put it in fine tilth. If it is desired to follow with wheat (not always advisable, however, on account of causing a too rank growth), the sod may be ploughed after the year's second mowing, disced and sown to rye to prevent the soil from leaching.

"Breaking up a well-set alfalfa field is no trifling matter. It may be done with three heavy horses, but it is hard work for them, and they will not be able to break more than one acre a day. An authority says the best plan is to use five heavy horses—three in the lead and two on the end of the beam. They can go right along and plough two acres a day. Alfalfa roots are very tough and strong when the plants have attained full growth, and they give a jerky motion to the plough which is severe on horses' shoulders. A cast steel plough is the best to use, and if it is tempered right a file can just cut it. It can be hammered out thin at the blacksmith's shop when it becomes too thick to file easily. The reason for filing, rather than using the hard, thin edge as in other ploughing, is that the edge needs to be rough as well as thin, or the roots will slip along the sloping edge of the share and not be cut. It is important that the furrow turned shall not be wider than the ploughshare will all the time cut clean, as any main roots that are left uncut will send up a more vigorous growth of stems than before, which, in another cultivated crop, will be the same as weeds."

In conclusion, I would earnestly urge every farmer in the State to properly work a small patch of sandy or loamy soil with an open subsoil on his holding. If only an acre is sown, at the rate of about 10lbs. of any variety of lucerne seed obtainable, if intended for a semi-permanent crop, or from 2lbs. to 6lbs. if mixed with the next wheat or cereal crop on fallowed land, I feel convinced the result will prove of such a satisfactory nature that South Australia will be known in the future as the "lucerne State."

TURRETFIELD DAIRY AND STUD FARM.

By P. H. SUTER, Dairy Expert.

The Turretfield Estate, consisting of about 1,600 acres of undulating country, is situated approximately 10 miles from Gawler. The soil is mostly a red loam, with here and there limestone rises, with about 200 acres of stony land and 50 acres of rich, dark, loamy flat. The property is well watered, the North Para River running through the centre of the property, with a reedy, salt creek coming through at the northern end. This property was purchased by the Government in 1908, and possession was given on November 10th of that year, together with a portion of standing crop, for which £150 was paid. The annual average rainfall may be set down at 19in.

This property was purchased with a view of setting aside a suitable area of land for the establishment of a stud farm for the raising of pedigreed cattle of the various milking breeds, the area required for this purpose being approximately 500 acres. The intention was to dispose of the balance, viz., 1,106 acres, by selling to farmers and, if possible, providing means whereby irrigation could be practised with the surplus waters of Barossa. Nothing, however, was definitely arranged, and the property has been worked as a whole on practically mixed farming lines, this arrangement being purely a tentative one. At the same time considerable attention has been given to the preparation of a portion of it for the successful carrying out of the original intention, viz., the establishment of a stud dairy farm.

During the last two years much land has been cultivated, and wheat-growing, &c., has been practised, together with the carrying of from 700 to 800 head of sheep and from 150 to 200 head of cattle. The working of the farm on these lines has been necessary to make revenue to meet the interest and working expenses, and such work has, of course, checked the early establishment of a stud dairy farm such as is desirable owing to the fact that much attention has been given to other than dairy work and breeding. Further, a goodly percentage of good grade dairy cows were purchased to assist to make revenue.

Whilst not working as desired, viz., purely as a stud farm, a number of pedigreed Jersey, milking Shorthorns, and Ayrshires have been purchased, and there is also a small herd of pure Red Danish dairy cattle. Then a number of good quality young bulls have been disposed of to the dairy farmers, and more are coming on.

Mr. Alick Murray, of Mount Crawford, presented that champion Jersey bull "Black Antimony," also a very nice quality heifer from champion stock. Further, the Government received a fine gift from the Canowie Pastoral

Company in the handing over of the whole of the imported Red Danish cattle, which are giving an excellent account of themselves at the bucket.

Since the purchasing of this property considerable improvements have been made in the building of a 30-stall cowshed and well-paved yards, bulls' sheds and yards, stables and yards, pigsties and yards, together with the subdivision of the paddocks and the laying on of the Barossa water. A small, but complete, cheese and butter factory has been established, together with all the requirements for the manufacture of bacon.

The farm buildings have been so arranged to allow of perfect drainage to one common open drain, which will water a small lucerne paddock. Several small paddocks have been laid down in permanent pasture and lucerne. The latter is now well established, and will give six cuts per annum of fully 1 ton to 1½ tons of hay to the acre per cut. It is intended to lay down a very much larger area during the coming year.

When such arrangements are made to take away 1,100 to 1,200 acres, and leave approximately 400 to 500 acres for a stud farm, only pure stud stock will then be kept, and I purpose then giving better attention to much work necessary to be carried out with stud stock breeding, feeding, and general dairy work, cheese, butter, and bacon manufacture, and the tuition of a number of young men in purely dairy farm practice and dairy products manufacture.

At present we have no stock of our own breeding being milked; still, the young cows selected give promise of developing into heavy milkers.

We are disposing of a number of young bulls possessing purity and coming from deep milkers. The breeding of this class of bull and the disposal of them to dairyfarmers at reasonable prices is absolutely essential if we are to expect a permanent improvement of the industry.

Several purchases have been made during the last year of Berkshires and Middle Yorkshires. These pigs are of excellent quality, and are selected from the foremost breeders in Victoria and New South Wales, Roseworthy Agricultural College, and the trustees of the late J. H. Angas.

We are now in a position to supply pigs of good quality to farmers throughout the State.

TURRETFIELD DAIRY FARM.

BALANCE-SHEET, MARCH 31ST, 1910.

		<i>Liabilities.</i>			
		£	s.	d.	£ s. d.
To H.M. Government—					
Revenue account	3,809	4	3		
Land and improvements	20,032	2	5		
Interest account	947	9	1		
					24,788 15 9
Donation (cattle presented by Alick J. Murray, Esq. and Canowie Pastoral Company)	—				220 0 0
Sundry creditors	—				604 17 2
					<hr/> £25,613 12 11

Assets.

	£	s.	d.	£	s.	d.
By Farm buildings, land, and improvements	--	--	--	20,031	6	5
Live stock, as per valuation--						
Horses	555	5	0			
Cattle	1,727	14	6			
Sheep	392	7	0			
Pigs	206	8	0			
Poultry	3	0	0			
				2,884	14	6
Working plant, &c., as per valuation--						
Implements, tools, and harness	854	10	0			
Dairy appliances and instruments	255	1	9			
Furniture	214	13	3			
				1,324	5	0
Stock on hand--						
Stores, General	11	11	11			
" Housekeeping	9	19	10			
" Dairy	14	3	6			
Manures	36	5	8			
Farm produce	944	4	6			
				1,016	5	5
Bare fallow, valued at	--	--	--	200	0	0
Growing crops (irrigation) valued at	--	--	--	12	5	0
Sundry debtors	--	--	--	94	3	0
Balance of profit and loss account	--	--	--	50	13	7
				£25,613	12	11

PROFIT AND LOSS ACCOUNT (FROM COMMENCEMENT TO MARCH 31ST, 1910).

	£	s.	d.	£	s.	d.
DR.						
To Irrigation				83	2	2
Housekeeping--						
Provisions	300	0	9			
Wages	107	10	7			
				407	11	4
Implements, tools, and harness- Depreciation	--	--	--	167	8	8
Dairy appliances- Depreciation	--	--	--	6	0	9
Furniture- Depreciation	--	--	--	41	13	4
				£708	16	3
CR.						
By Dairy, profit on	268	3	7			
Horses	45	14	5			
Sheep	27	5	4			
Pigs	3	1	4			
Poultry	3	18	1			
Farming	128	15	1			
Hire of cattle and service fees	16	17	6			
Wool account	164	7	4			
				658	2	8
Balance	--	--	--	50	13	7
				£708	16	3

HORTICULTURAL NOTES.

By G. QUINN.

BUDDING.

The present is a suitable time for inserting buds into both young stocks in the nursery and shoots arising from older trees in the orchard when a change of sort is desirable. The process is extremely simple, and readily learned after a little practice. The commonly used form is known as "shield" budding, i.e., the bud as cut from the parent twig is carried upon a shield-shaped piece of bark. The essentials to be observed are—(1) A close botanical relationship between the plants of the stock and scion, which means if peach be budded on to peach and apricot on apricot a more perfect union is achieved. (2) The sap of the *stock* plant must be actively circulating. Mechanical as well as physiological reasons demand this condition—the former to enable a ready separation of the bark from the woody layers, and the latter to supply an immediate contact of living substances required to unite, nourish, and renew the cells of which the bud is composed. The condition of vegetative activity or otherwise in the shoot from which the bud is cut does not appear to affect the issue. (3) The operation must be performed with sufficient expedition to avert the drying of the cut surfaces beneath the bud and its shield as well as upon the sap layer of the stock upon that spot which receives the bud. In simple language the moist surfaces at the back of the bud and the sap layer of the wounded stock must be brought into contact, and by firmly pressing these together and binding them in that position the dry air is excluded and a fusion of the tissues obtained. These are practices which are commonly observed, but in the prosecution of the more strenuous forms of modern fruit culture the selection of buds and stocks and the attention to their after treatment call loudly for closer study. With rare exceptions like produces like, and differentiation of characteristics tend to extend, not only into individual plants, but even into particular branches of the same plant. If this be accepted we must, as far as practicable, note those trees, and even branches upon the variety of tree, which appear to possess the most desirable combination of qualities of health, fruitfulness, and suitable habit of growth, and propagate from those only. The question of the selection of stocks promises important results in relation to certain orchard trees. We may reasonably ask why do the trees of some varieties of almonds burst

their tissues, exude gum, and decline prematurely when worked upon the seedling of the ordinary nursery type which apparently proves to be a most satisfactory foundation for other kinds. The argument in respect to the question of the closest botanical relationship alone securing affinity cannot be followed absolutely under certain phases of fruit culture. Stocks belonging to closely allied genera are sometimes called upon to overcome certain disabilities. For instance, some varieties of pears and loquats are budded upon quince stocks. This, however, is not because they grow best upon the quince—rather to the contrary—but that crops of fruit are assured within a shorter period. Whilst it may be claimed, on the other hand, that when planted in strong moist soils the longevity of these trees budded upon the quince stock in our climate has not yet been seriously challenged, observation causes one to advise the adoption of this combination when planting in such soils only. The after attentions to the budded plants to which reference is directed consist of loosening the binding tie as soon as the bud is united to its new position, and observing that no constriction of the swelling stock takes place through any oversight of this. These are also commonplace observances. A phase of the after treatment consists in cutting away that portion of the stock above the inserted bud, so that, being placed at the greatest elevation of the tree or branch, it shall receive the fullest share of sap. This is usually done in the winter season prior to the rise of the sap. It is extremely doubtful if the mode of removal commonly adopted always commands that care which its importance warrants. The use of blunt or notched secateurs is not always avoided, neither is the mode of using the pruning shears often considered. Wounds made in this manner present opportunities for the entrance of agents of decomposition, whose subsequent operations are often more certain than apparent to the casual observer.

SUMMER PRUNING

At the harvesting time strong wood shoots are frequently found arising from the inner faces of the limbs which form the framework of the apricot tree. These usually arise in close proximity to a large wound. If cut out completely there is a danger of similar rank growths emerging next summer. They should be cut back to a length of about 6in. to 9in. as soon as the fruit is removed, and usually the summer season is sufficiently prolonged to permit fruit-bearing wood arising from these portions being retained. In the case of peach, apricot, and nectarine trees frequently three or four strong leaders have arisen from the topmost buds upon last year's leader. These may receive a thinning in the shape of completely removing those not likely to be needed in continuing the framework of the tree. Apples, pears, and plums of a vigorous type should also receive treatment upon somewhat similar lines. If the laterals are numerous in the centre of the tree they

should be thinned out, but such may take the form of partial rather than complete removal. The laterals which project from the outer faces of the framework limbs of the trees of peach, plum, apple, and pear should not be shortened unless they have grown so lengthy that they lie upon the soil, or project into the danger zone of injury from tillage implements. Newly planted trees of all kinds yet in the stage of balancing the framework limbs may need attention in the shape of pinching out the terminal points of the strongest shoots to stunt them temporarily to the gain of their weaker fellows. This practice may with advantage be applied to the rapidly growing limbs of trees planted in wind-swept positions which are liable to be bent out of place. Strong sappy shoots arising from grafts on pear trees undergoing renovation frequently extend out of proportion to their stability. These may be prevented from receding into a pendulous position by pinching off their sappy ends, thus inducing the formation of the fibrous tissues essential to their stiffening. Young nursery stock require attentive watching from time to time to prevent shoots from the stock getting a strong start to the great detriment of the portion arising from the buds or grafts.

SPRAYING.

Apples are scarce, and growers who find a sprinkling upon their trees will be rewarded for attempting to save every one possible from the ravages of codlin moth and *Fusicladium*. Spraying with arsenate of lead has gone beyond the testing stage as far as checking the ravages of the former is concerned, whilst Bordeaux mixture acts as a restraint upon the latter, even after the fruits have reached half full size. This fungus disease has been much favored this season by climatic conditions.



ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, December 14th, there being present Messrs. J. Miller (in the chair), G. R. Laffer, C. J. Valentine, G. Jeffrey, C. Willcox, and A. M. Dawkins.

The formation of a Branch of the Agricultural Bureau at Monteith, with the following gentlemen as members, was approved :—Messrs. R. Magor, O. J. Murphy, E. Eldridge, G. Wyld, H. Hode, O. E. Male, H. Gardner, F. Hannaford, E. Heithersay, J. Jacobs, T. R. Smith, F. J. Bradford, P. W. Gregory, A. Bridgerand, H. Crawford, W. Montstephens, W. H. Carter, J. MacCaskel, H. F. Blake, D. McDonald, J. Redden, J. Rowen, E. Gun, G. Gun, L. Bell, A. Clark, A. Pinchback, R. Hannaford, A. S. Martin, and D. Travers.

Carrieton Branch asked the Board to endeavor to secure the support of the Branches in making a request to the Government that weighbridges should be erected at all railway stations where wheat was loaded, in order to enable wheat to be weighed by truckload, and do away with the dissatisfaction in reference to weighing, and also to save time. Members were of opinion that the proposal would involve too great an outlay, and thought that if the district councils carried out the regular testing of weighing machines the results would be more satisfactory to farmers. [In view of the fact that such a large proportion of the wheat purchased at railway stations goes into stack, weighing in trucks when delivering is not practicable. As the local governing bodies are responsible for the testing of all weights and scales, farmers can protect their interests by insisting on the law being carried out by the local council officers.—Ed.]

Redhill Branch inquired whether there was any law governing the establishment of draught horse stud books, and if not, requested that the Board should take steps to secure some action to secure the same. The Secretary pointed out that this was a matter that was not touched by legislation. It was decided to write to the Royal Agricultural Society in reference to the establishment of a draught horse stud book.

Mount Gambier and Port Pirie Branches submitted resolutions to the effect that it would be an improvement if more time at the Annual Congress were devoted to the addresses by the experts attached to the department, and less to papers by country Branches. This view was indorsed by the members of the Advisory Board.

The following gentlemen were approved as members of the undermentioned Branches :—Messrs. G. Smeaton, C. J. Everard, and F. A. Cunningham, Renmark ; H. Illmann, Salisbury ; J. P. Hall, Parrakie ; W. E. Harford,

Port Broughton ; F. Wood, A. H. Anderson, W. A. Nash, G. A. Nash, Kingscote ; W. Lock, G. Charlton, J. Bowden, T. Millard, C. R. Dohnt, Geranium, J. Sullivan, M. Kilmartin, J. Naish, Tatiara ; A. E. Forster, Frances ; H. Sass, Forest Range ; L. Smith, Meadows ; S. Cameron, E. P. Weyland, P. V. Ryan, T. Bartlett, Murray Bridge ; S. Thiselton, Wirrabara ; W. R. Birks, Kybybolite ; A. Hill, Clare ; P. Dunstan, O. Dunstan, V. Sobels, Watervale ; R. Gore, J. Tickle, Redhill ; M. Kenny, J. Peddick, L. Masters, Clarendon ; H. Gosden, Port Elliot ; H. J. Manning, Dingabledinga ; M. F. Lee and A. A. Hall, Parrakie ; N. F. Connolly and A. Smoker, sen., Davenport.

CEREAL EXHIBITS AT AGRICULTURAL SHOWS.

BY W. L. SUMMERS.

Where our agricultural societies adopt "objects and constitution" the aim of the society is usually stated to be "for the holding of shows and for the advancement of the agricultural interests of the district." Sometimes it takes a number of clauses to set forth the objects of the society, but the above practically covers the ground. As shown by the returns submitted by societies receiving subsidies from the Government, the expenditure of these agricultural and horticultural societies—not including the Royal Agricultural and Horticultural Society, poultry, and other special societies—for 1909 exceeded £20,000. The Government grants to these societies totalled £1,350, and it is worthy of consideration to what extent the large expenditure referred to really makes for "the advancement of the agricultural interests of the district" or the State.

I am quite aware that any person who has the temerity to suggest or advocate any radical alteration in our present system of holding agricultural shows is likely to call down on his devoted head criticism which will lack

neither in quantity or vigor. That too many shows are held a large number of those interested will agree, but when we come to measures to limit the number then there is no agreement. Many readers will remember the reception which met the proposal made about 10 years ago by Professor Lowrie that the Government subsidy should be limited to about four shows in convenient centres. To a certain extent this system has been adopted with great success in West Australia, where each year one of the leading centres is selected as the national show and heavily subsidised by the Government. This does not do away with the other country shows, nor does it interfere with the Perth shows.

It is not, however, my purpose to discuss this aspect, but rather to call attention to the importance, as judged by the prize lists attached by the societies, to the different sections of the agricultural industry. Calculated upon our agricultural statistics, we find that for 1909-10 the value of cereal production was quite double that of wool, which comes next in value.

The following figures show how the prize money was distributed by the societies last year :—

	£		£
Horse stock	4,195	Vegetables	277
Sheep	1,207	Grain, flour, and hay	272
Poultry, dogs, and birds...	917	Pigs	227
Cattle	810	Fruit	190
Flowers and pot plants....	703	Jams and preserves	116
Dairy produce	441	Miscellaneous	1,403
Agricultural implements ..	299		

It should be mentioned that the figures of the Royal Agricultural and Horticultural Society are not included in the above. A study of these figures in comparison with the values of our staple products affords food for much thought. Cereals and cereal products form by far the most important item in the production of the districts catered for by the societies; yet we find, judged by the prize-money standard, that it is of least importance in our shows. When we realise that the prosperity of the State is dependent more upon the cereal crop than any one other item of production, surely societies that exist to "advance the agricultural interests of the district" are not carrying out their purpose when they neglect it in this way. To the greater number of the show committee members wheat is a far more important factor to their prosperity than any of the sections which overshadow it on their prize lists.

The answer that most committees will give to the question suggested above is that they must give the greatest prominence to those sections in which the public show most interest; and there is no question that live stock, especially horses in action, are the chief attractions at our shows. This

attitude of the societies is not unreasonable, because they cannot carry on without the funds contributed by the public. This does not, however, warrant the neglect of the more important cereal industry.

I would therefore suggest for consideration of members of committees of agricultural societies that in drawing up their prize lists greater liberality should be extended to the cereal sections, and conditions framed so that the result of this liberality will be the improvement of the cereal industry of the district. The prizes given in most instances do not attract the competition they should. This is attributed by farmers to two factors—first, the prizes are not large enough to compensate for the cost and time involved; and secondly, the grains that win under present conditions are not profitable varieties to grow; in other words, the wheat that will weigh the most per measured bushel will win in most cases from the wheats that give the best financial return. Further than this, the special preparation of the wheat for show necessary to make it look well and weigh well, prevents the average farmer from competing, and also destroys his interest in the exhibits at the show. To overcome this difficulty I would suggest that the chief prizes should be given to the most profitable varieties of grain by stipulating that the 3bush. exhibited must be the average of a bulk of not less than 50bush. (or whatever quantity is considered best), and giving points for weight, appearance, and yield. Space will not permit of any details in this article, but to overcome the objection where the show is held in the spring to so much grain being held over for nine months or more, it would be a simple matter to arrange for the samples to be drawn from bulk in the presence of one of the society's stewards and sealed up as soon as convenient after harvest.

Another suggestion, which I am pleased to say is being adopted by several societies, is to offer substantial prizes for the greatest amount of wheat produced on a quarter of an acre; the idea being to encourage the growers to improve the production of the district by the selection of the most prolific wheats of good milling type. Other suggestions will doubtless occur to readers; but the chief point to keep in mind is that the object of the prizes offered should be to improve the monetary returns of the producers and abolish the present absurd position of allowing our grain prizes to be won by varieties that, from a financial point of view, are inferior.

THE USE OF GYPSUM.

The following letter addressed by Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S., in reply to an inquiry concerning the use of gypsum, will be of interest to many readers of the *Journal* :—

“ Gypsum, or land plaster, was at one time regarded as an important fertiliser, more especially applicable as a top dressing for clover pasture. For many years, however, its use has steadily declined, and although it has admittedly a powerful action in setting free potash from the double silicates of the soil, it cannot be said to have any direct action as an artificial fertiliser.

“ In years past it was used largely as a manure for clover leys, peas, and other leguminous crops with good effect. It was thought that this was due to the lime it contained, and this view was supported by the fact that the crops that benefited most from ‘ plastering ’ were all of the lime loving class, but it was eventually shown that the same results could not be obtained from the application of pure lime instead of the sulphate of lime. Furthermore, it was difficult to account for the good effects produced by gypsum on soils largely charged with lime.

“ Another old view was that the plants absorbed the gypsum through the leaves as fast as it was dissolved by the dew or rain. These old views, however, were quite erroneous. There is no longer any difficulty in explaining the action of gypsum as a fertiliser. Its chief value depends upon its power of setting free potash, and it is well known that leguminous crops, such as peas and clover, are particularly responsive to potassic manures. Generally speaking, therefore, it can never be expected to become an important fertiliser under South Australian conditions. There are parts of the South and South-Eastern country where good results might follow if it were judiciously applied ; but it must be remembered that inasmuch as it adds no potash to the soil, but simply unlocks the natural stores of that element of plant food inherent in the land, it can only be regarded as a soil stimulant. It would appear to be better practice, therefore, to substitute some form of potassic manure for the gypsum, even in cases where good results might fairly be anticipated from the use of the latter. In this connection I should also mention that nearly one-half of the weight of the mineral superphosphates such as are used in this State consist of gypsum, and consequently little benefit, if any, could be expected from the addition of further quantities of gypsum.

“ So far I have referred only to the main action of gypsum, but there are several others of less importance which it may be as well to mention.

" 1. According to Snyder, under laboratory conditions it also liberated phosphoric acid, but in inappreciable amounts.

" 2. It is fairly generally credited with being able to fix the ammonia in the air to the benefit of the plants; but in any case the quantities of ammonia occurring in field air are so small that this property has no practical value.

" 3. It is said to hasten the process of nitrification in the soil by neutralising the alkalinity of the nitrifying solution. Under South Australian conditions, however, the nitrifying germs are so energetic, and work under such favorable conditions, that for the most part the application of nitrogen has proved an unprofitable venture. However, we shall not always be in this happy position with regard to nitrogen, and I am inclined to think that the time is not far distant when more consideration will have to be given to ways and means of conserving this important plant food.

" 4. It has been assumed, and possibly correctly, that gypsum acts as an oxidising agent in the soil. If this be so, it is likely that part of the benefit to be derived from its application under certain conditions is due to the oxidation of the organic matter in the soil.

" 5. Until recently it was believed that gypsum was useful in preventing or lessening the loss of ammonia from manure heaps by producing calcium carbonate and sulphate of ammonia, but according to many recent experiments (Burri, Herfeldt, and Stutzer) it is quite useless for this purpose. Although from this point of view gypsum is not to be recommended to be applied directly to the manure heap, yet, when scattered on the floors of the stables, byres, and styers, it may, by absorbing the odors, checking the fermentations, and drying and sweetening the buildings, do good work.

" 6. On some kinds of soils, such as clays, gypsum, like many other calcium compounds—particularly lime—will act beneficially on the physical nature and texture by flocculating or granulating the finer particles. For this purpose, however, lime would be a much better material to use.

" 7. Roberts, in his book on the 'Fertility of the Land,' has drawn attention to the value of gypsum for conserving moisture, or securing it from the air, specially when applied on friable soils; but judicious and seasonable cultivation are of much greater importance for this purpose in South Australia.

" As to the influence of gypsum on 'grubs and sorrel,' all I can say is I know nothing of its effects as a preventive, although I know only too well that the use of superphosphate, which contains a large quantity of gypsum, encourages rather than retards the spread of sorrel."

THE WHEAT MARKET.

The wheat market during December was remarkable for its steadiness, the uniformity in the daily quotations which has prevailed for several months being more remarkable than ever. On January 6th the price on trucks at Port Adelaide was the same as it was on December 6th. In the other States the prices showed little variation, but they were as a rule from $\frac{1}{2}$ d. to 1d. above the Port Adelaide quotation. The latest London sale officially reported took place at 4s. 6 $\frac{1}{2}$ d. per bushel for January-February shipment, or 11d. above the present Port Adelaide price.

The English trade papers are dubious as to the future trend of the home market, on which Australian prices depend. *Broomhall* writes on November 22nd :—

To sum up, we can certainly say that the outlook for wheat-holders is fairly bright. We are entering a period when shipments are sure to decrease, and the consumption most likely to increase, whilst one of the main sources of supply (the Argentine) for the new year has not only reported deteriorated crops, but seems inclined to send reports which grow worse rather than better. But while giving full prominence to these considerations, and we may add thereto a fair revival of the Continental demand, yet still we feel we must remind our readers of what we have said in recent reviews about the size of visible stocks. These are undoubtedly very large at importing places, and they are large at exporting places in south-eastern Europe, particularly so at those ports which ship during the winter; and finally, the visible stocks in America are likewise large. It may be that these visible stocks have been formed at the expense of the invisible, and we think that this is the case to some extent, but so far we have no certain proof of this, and in the meantime the stuff is there ready for buyers. The recent course of American markets in keeping prices down in face of firmness on this side seems to call for careful watching. We do not believe in big exports from the United States. The home demand there and general conditions do not seem to warrant such; but it is easy to see that if American prices keep down whilst ours go up, it would not take long before prices were at a level that would permit of exports. We think that the recent improvement in the wheat market rests on a good foundation of fact, but actual supplies on hand seem too large to permit of a booming market, unless, of course, there should be some really sensational crop news.

Ten days later there were better reports from the Argentine, and the London market showed a decline of 1s. to 1s. 3d. per quarter, but recovered as a result of a renewed demand from France and a decrease in the American visible supply. Russia again has surprisingly large stocks, the total yield of winter and spring wheat being estimated at 96,600,000 quarters, or only 1,000,000 quarters less than last year's record crop. *Beerbohm* estimates the world's wheat crop at 459,100,000 quarters as compared with 459,320,000 quarters last year. A week earlier (November 25th) *Beerbohm* wrote :—

The enormous shipments of the last three months have not only satisfied the exceptionally large requirements this season, but have resulted in large stocks being formed almost everywhere, so that there is no prospect of scarcity for some time to come. With regard to the future, much will depend on the Argentine, and also on Russia. From the latter country exports to date have been very large, and there are large port stocks, but it depends on the quantity of wheat still to come forward from the interior as to whether Russia can equal her large exports of the previous season.

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Dec. 5	—	3/7½ to 3/8	o.s. 3/9; n.s. 3/8 to 3/9½	3/8 to 3/8½ b.; 3/9 to 3/9½ a.
6	Firm, quiet	Do.	o.s. 3/8½ to 3/9; n.s. 3/8 to 3/8½	Do.
7	Jan.-Feb. 4/6½	Do.	Do.	Do.
8	Dull; no demand.	Do.	Do.	3/9
9	Off coast 4/6	3/7 to 3/8	o.s. 3/8½; n.s. 3/8 to 3/8½	—
10	Very dull	3/7 to 3/7½	o.s. 3/8 to 3/8½; n.s. 3/7½ to 3/8	—
11	—	3/7	o.s. 3/8; n.s. 3/7½ to 3/8	3/7½ to 3/7½ b.; 3/8 a.
12	Steady held; inactive	3/7½	Do.	3/8
13	Steady; quiet	3/7 to 3/7½	o.s. 3/7½ to 3/8; n.s. 3/7½	3/7½ b.; 3/8 a.
14	Off coast, 4/6 b.	3/7½	3/7½ to 3/8	3/7½ to 3/8 b.; 3/8 to 3/8½ a.
15	Off coast 4/6½	Do.	Do.	Do.
16	Steady; quiet	3/7½ to 3/8	Do.	—
17	—	Do.	Do.	3/7½ to 3/7½ b.; 3/8 a.
18	Dull and neglected	3/7 to 3/7½	3/8	3/7½ to 3/8
19	Dull; easier tendency	3/6½ to 3/7	3/7½	Do.
20	Feb. 4/4	Do.	3/7 to 3/7½	3/7 to 3/7½
21	Steady; quiet	Do.	3/7½	3/7 b.; 3/8 a.
22	—	Do.	—	—
23	—	Do.	—	—
24	—	Do.	—	—
25	—	Do.	—	—
26	—	Do.	—	—
27	—	Do.	—	—
28	—	Do.	—	—
29	—	Do.	3/7½	3/7½
30	Firmer: improved demand.	Do.	3/7½ b.; 3/7½ a.	3/7 to 3/7½
31	—	Do.	—	—
Jan. 2	—	Do.	—	—
3	Jan.-Feb. 4/6½	Do.	3/7½	—
4	Firm, sellers asking 3d. to 6d.	Do.	3/7½ to 3/7½	—
5	advance per qr.	3/7½	3/8	3/8

STEAMER FREIGHTS.—For parcels, Adelaide to London, 20s. per ton (6½d. per bush.) offering; to Liverpool, 21s. 3d. per ton (6½d. per bush.); to Dunkirk or Antwerp, 22s. 6d. per ton (7½d. per bush.). For tramp steamers, full cargoes South Australia to United Kingdom-Continent, the current rate is 27s. per ton (8½d. per bush.). Port Adelaide to Melbourne 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—The freight market is firm, and for United Kingdom-Continent 24s. per ton (7½d. per bush.) is offering; to South Africa, 20s. per ton (6½d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for December, 1910, at the undermentioned stations, also the average annual rainfall and the total rainfall for 1910 and 1909 respectively :-

Station.	For Dec, 1910.	Av'ge. annual rainfall	Total rainfall 1910	Total rainfall 1909.	Station	For Dec, 1910.	Av'ge. annual rainfall	Total rainfall 1910.	Total rainfall 1909.
Adelaide ...	1.25	20.55	24.62	27.69	Hamley Bridge	0.86	16.48	21.08	21.11
Hawker	0.25	12.13	15.53	13.89	Kapunda ...	1.58	19.71	24.97	25.43
Cradock	0.34	10.69	15.55	11.60	Freeling	1.14	17.85	23.94	22.26
Wilson	0.66	11.68	18.30	13.14	Stockwell ...	2.20	20.29	24.66	22.82
Gordon	0.32	9.91	14.42	12.22	Nuriootpa ..	1.94	21.37	26.74	27.62
Quorn	0.62	13.75	18.51	14.89	Angaston ...	2.28	21.96	29.75	29.07
Port Augusta	0.71	9.62	17.52	12.87	Tanunda ...	2.72	21.95	30.86	28.49
Port Germein	0.37	12.62	20.66	15.23	Lyndoch	2.19	23.05	28.17	29.09
Port Pirie ..	0.80	12.86	25.40	13.96	Mallala	0.85	16.86	22.53	21.78
Crystal Brook	1.20	15.42	23.24	18.16	Roseworthy .	1.34	17.39	23.63	23.77
Pt. Broughton	0.83	14.19	20.96	16.45	Gawler	1.32	19.26	24.58	25.77
Bute	0.51	15.22	23.81	19.21	Smithfield ..	1.20	17.24	23.31	22.17
Hammond ..	0.60	11.22	18.59	14.58	Two Wells ..	0.62	16.51	20.74	19.89
Bruce	0.56	9.50	17.35	11.04	Virginia	1.20	17.57	24.24	22.90
Wilmington .	0.87	18.06	26.06	20.33	Salisbury ...	1.52	18.45	25.39	23.90
Melrose	1.32	23.03	31.94	28.40	Teatree Gully	2.55	28.64	33.35	38.07
Booleroo Cntr	0.70	15.94	21.41	17.06	Magill	2.30	25.94	28.39	27.39
Wirrabara ...	0.98	18.74	28.45	22.96	Mitcham	1.66	23.80	24.77	30.82
Appila	0.93	14.87	25.33	17.11	Crafrers	3.79	46.65	55.80	68.63
Laura	1.26	18.02	30.02	24.31	Clarendon ..	2.58	33.86	37.33	42.23
Caltowie	1.26	17.19	23.70	18.78	Morphett Vale	1.06	23.50	27.13	30.75
Jamestown ..	1.27	17.21	23.83	20.18	Noarlunga ...	1.02	20.23	25.54	27.57
Gladstone ..	1.32	15.84	23.09	16.68	Willunga ...	1.93	25.86	34.83	36.14
Georgetown .	1.73	18.10	27.72	18.41	Aldinga	1.29	20.33	27.16	29.67
Narridy	0.74	16.83	21.08	16.22	Normanville	1.91	20.57	30.50	25.67
Redhill	0.71	16.62	26.64	20.03	Yankalilla ...	2.03	21.95	38.86	30.02
Koolunga ...	0.71	15.73	25.51	18.71	Eudunda	1.22	17.06	27.84	15.47
Carrieton ...	0.56	12.03	19.70	14.45	Sutherlands .	0.50	10.26	15.94	12.28
Eurelia	0.87	13.14	19.52	13.75	Truro	2.29	19.49	26.51	25.47
Johnsburg ...	0.51	9.96	16.44	12.40	Palmer	1.53	15.26	21.80	18.71
Orroroo	0.63	13.41	18.88	13.91	Mt. Pleasant.	3.30	26.88	33.23	32.94
Black Rock ..	0.70	12.13	19.63	14.41	Blumberg ...	4.04	29.65	35.00	36.63
Petersburg ..	0.49	12.06	16.96	13.24	Gumeracha ...	3.84	33.36	39.69	46.98
Yongala	0.63	13.83	19.10	15.83	Lobethal ...	3.54	35.74	38.16	47.78
Terowie	0.63	13.56	21.16	15.59	Woodside ...	3.03	31.74	38.55	46.14
Yarcowie ...	0.74	13.66	22.32	15.65	Hahndorf ...	3.21	35.61	41.35	48.09
Hallett	0.89	16.35	20.47	15.00	Narne	2.30	28.89	35.00	39.50
Mount Bryan	0.47	15.59	21.28	14.98	Mt. Barker ...	2.77	30.96	35.44	40.20
Burra	0.53	17.72	24.81	18.17	Echunga ...	3.00	32.77	41.26	48.31
Snowtown ...	0.49	15.72	21.86	19.13	Macclesfield .	2.32	30.68	40.36	41.57
Brinkworth .	0.49	15.08	22.00	17.17	Meadows ...	3.22	35.47	43.93	47.25
Blyth	0.60	16.28	21.71	22.33	Strathalbyn .	1.37	19.13	28.01	28.98
Clare	0.96	24.30	31.63	28.92	Callington ...	1.29	15.82	19.63	20.39
Mintaro Cntrl.	1.15	22.16	26.62	25.26	Langhorne's B	0.85	15.41	19.50	19.72
Watervale ...	1.37	27.42	31.07	32.16	Milang	1.07	16.40	17.46	18.13
Auburn	1.80	24.30	34.03	33.39	Walleroo ...	0.82	13.86	20.45	18.16
Manoora ...	1.18	18.29	22.59	21.47	Kadina	0.62	15.82	19.72	19.91
Hoyleton ...	0.70	18.11	21.22	20.20	Moonta	0.59	15.22	17.22	20.32
Balaklava ...	0.60	16.00	22.42	18.86	Green's Plns.	0.39	15.94	19.70	21.05
Pt. Wakefield	0.26	12.98	17.65	16.12	Maitland ...	0.92	20.10	22.80	26.68
Saddleworth	1.26	19.85	23.62	22.00	Ardrossan ...	0.64	13.82	17.78	17.82
Marrabel ...	1.15	19.24	23.28	25.45	Port Victoria	0.48	15.12	17.54	19.63
Riverton ...	1.33	20.54	27.02	25.46	Curramulka .	0.74	18.55	24.74	22.90
Tarlee	1.20	17.51	23.16	21.85	Minlaton ...	0.72	17.41	22.08	21.53
Stockport ..	1.69	15.98	18.90	17.81	Stansbury ...	0.54	16.92	21.96	22.74

RAINFALL TABLE—*continued*

Station.	For Dec., 1910.	Av'ge. annual rainfall.	Total rainfall 1910.	Total rainfall 1909.	Station.	For Dec., 1910.	Av'ge. annual rainfall.	Total rainfall 1910.	Total rainfall 1909.
Warooka ...	0.74	17.47	23.54	18.74	Bordertown .	1.31	19.94	21.35	23.19
Yorktown .	1.04	17.36	23.21	18.74	Wolseley ...	1.36	17.80	22.71	23.09
Edithburgh .	0.80	16.39	23.36	18.51	Frances	1.50	20.55	25.50	23.85
Fowler's Bay	0.13	12.15	12.23	13.74	Naracoorte .	1.98	22.49	28.30	27.16
Streaky Bay.	0.20	15.17	17.60	18.39	Lucindale ..	2.01	22.99	31.05	29.47
Port Elliston	0.09	16.13	20.96	18.28	Penola	1.84	26.72	33.67	30.72
Port Lincoln.	0.50	19.79	25.18	19.85	Millicent ...	2.32	28.93	38.55	38.80
Cowell	—	11.78	13.10	10.73	Mt. Gambier.	2.73	31.76	44.19	41.85
Queenscliffe .	—	18.31	—	20.21	Wellington .	0.78	15.08	19.53	20.24
Port Elliot .	1.66	20.37	25.11	21.33	Murray Bridge	0.97	14.32	21.49	20.28
Goolwa	1.91	17.74	26.09	24.49	Mannum ...	0.30	11.64	19.12	22.69
Meningie ...	1.47	18.92	23.11	24.24	Morgan	0.12	9.15	13.31	8.34
Kingston	1.46	24.37	31.45	30.50	Overland Crnr	0.36	11.27	17.70	9.66
Robe	1.57	24.63	32.30	30.92	Renmark ...	0.26	10.80	14.97	10.92
Beachport... .	1.95	27.17	39.81	38.83	Lameroo ...	0.67	16.36	19.25	18.29
Coonalpyn ..	1.26	17.64	18.61	23.14					

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on January 2nd :—

EGGS.

December opened at 8½d. for circle graded, and 7½d. for ordinary market lines. Local demand was good, but inter-State trade was not brisk, principally owing to large home supplies and partly through the difficulty experienced in getting consignments aboard owing to strike of carters and carriers. The weather was mild throughout the month, causing quality to be well maintained, but supplies began to show the usual seasonal falling off. The month closed at 9½d. for circle graded and 8½d. for ordinary market lines.

BUTTER.

The very mild weather during the month is accountable for a large supply of cream, and as the standard of both grades of butter has been kept up to the usual degree of excellence, a large demand has been the result, both locally and otherwise. The prices have varied during the month, the concluding prices being superfine 11d. per pound and pure creamery 10d. per pound.

Messrs. A. W. Sandford & Co. report on January 2nd :—

POTATOES.—New locals, £7 to £7 10s., Adelaide, per ton of 2,240lbs.

ONIONS.—New locals, £4 10s. on trucks, Adelaide, per ton of 2,240lbs.

BUTTER.—Factory and creamery, fresh in prints, 9½d. to 11d.; second grade factories, 9d.; choice separators, dairies, 8½d. to 9½d.; fair quality, 7½d. to 8d.; stores and collectors', 6½d. to 7d. per lb.

CHEESE.—Factory makes, new season's, for large to loaf, 4½d. to 5½d.; matured, up to 6d. per lb.

BACON.—Factory-cured sides, 7½d. to 8d. per lb.

HAMS.—In calico, 10d. to 11d. per lb.

EGGS.—New-laid, 8½d. per dozen for prime, guaranteed.

LARD.—Skins, 6½d.; tins or bulk cases, 6½d.

HONEY.—Prime clear extracted, new season's, 2½d. for prime liquid; dark and old, 1d. to 1½d.; beeswax, 1s. 2d. per lb.

ALMONDS.—(Scarce) Softshells, Brandis, 6½d.; mixed softshells, 6½d.; kernels, 1s. 3½d.

LIVE POULTRY.—Good table roosters, 3s. 6d. to 4s. each; plump cockerels, 2s. 6d. to 3s.; hens and light cockerels, 1s. 4d. to 2s.; ducks, 2s. 3d. to 3s. 6d.; geese, 4s. 6d. to 5s. 6d.; pigeons, 9½d.; turkeys, 10d. to 11d. per lb., live weight, for fair to good table birds.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Jan.	Feb.			Jan.	Feb.
Amyton	*	—	14	Meningie	*	14	11
Angaston	627	14	11	Merghiny	*	5	2
Appila-Yarrowie	624	—	—	Millicent	*	10	14
Arden Vale & Wyacca	*	—	—	Miltalie	630	14	11
Arthurton	*	—	—	Minlaton	*	21	18
Balaklava	*	—	—	Mitchell	*	—	—
Beetaloo Valley	*	—	—	Moonta	*	—	—
Belalie North	†	14	11	Morchard	*	—	—
Blyth	*	17	21	Morgan	*	—	—
Bowhill	*	—	—	Morphett Vale	*	—	—
Bowmans	*	12	9	Mount Bryan	624	14	11
Brinkworth	*	21	18	Mount Bryan East ..	625	7	4
Bute	*	13	—	Mount Gambier	641	—	—
Butler	*	—	—	Mount Pleasant	638	—	10
Caltowie	*	14	11	Mount Remarkable ..	*	12	9
Carrieton	*	12	9	Mundoora	*	—	—
Cherry Gardens	636	10	7	Murray Bridge	*	—	—
Clare	628	13	10	Nantawarra	*	11	8
Clarendon	637	9	13	Naracoorte	*	14	11
Colton	*	14	11	Narridy	*	—	—
Coomooroo	622	—	—	Northfield	*	—	7
Coonalpyn	*	—	—	Orroroo	*	—	—
Cradock	*	—	—	Parrakie	633	7	4
Crystal Brook	*	—	—	Paskeville	*	14	11
Cummins	629	—	11	Penola	642	7	4
Davenport	622	—	—	Penong	*	—	11
Dawson	*	—	—	Petina	631	—	—
Dingabledinga	*	13	10	Pine Forest	*	—	7
Dowlingville	*	—	—	Port Broughton	*	—	24
Elbow Hill	*	—	—	Port Elliot	638	21	18
Forest Range	*	12	9	Port Germein	*	—	—
Forster	*	—	—	Port Pirie	*	—	—
Frances	639	13	10	Quorn	623	—	—
Freeling	*	—	—	Redhill	625	17	14
Gawler River	*	—	—	Renmark	633	—	—
Georgetown	*	14	11	Rhine Villa	*	—	—
Geranium	631	28	25	Saddledworth	*	21	17
Green Patch	*	9	13	Salisbury	*	—	7
Gumeracha	*	9	6	Shannon	*	—	—
Hartley	637	—	—	Sherlock	634-5	—	—
Hawker	*	16	13	Stockport	*	—	—
Hookina	*	14	11	Strathalbyn	*	16	20
Johnsburg	*	—	—	Sutherlands	*	—	—
Kadina	*	12	9	Tatiara	*	—	—
Kalangadoo	639	14	11	Uraidla and Summert'n	*	—	6
Kanmantoo	*	13	10	Utera Plains	*	14	11
Keith	640	—	—	Waikerie	635	—	—
Kingscote	†	3	7	Watervale	628	—	—
Kingston	640	28	25	Wepowie	*	—	—
Koppio	630	—	—	Whyte-Yarcowie	626	—	—
Kybybolite	641	26	9	Willowie	*	—	—
Lameroo	*	—	—	Willunga	*	7	4
Lipson	*	—	—	Wilkawatt	*	—	—
Longwood	637	11	8	Wilmington	*	11	8
Lucindale	*	—	18	Wirrabara	623	—	—
Lyndoch	*	—	—	Woodside	*	—	—
Maitland	*	7	4	Yallunda	*	—	—
Mallala	*	2	6	Yongala Vale	*	—	—
Mannum	*	28	25	Yorketown	*	14	11
Meadows	*	—	—				

* No report received during the month of December.
† Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD)

Coomooroo, November 28.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berryman (chair), Brown, Brice, Avery, Hall, Robertson, and Kildea (Hon. Sec.).

HARVESTING AND MARKETING WHEAT.—A paper on this subject was read by Mr. Hall. As a general principle, he said, wheat should not be harvested until properly ripe, but varieties which were liable to shake out could be reaped just before dead ripe, and be left in the heap to ripen. He preferred the harvester to the stripper, because of the scarcity of labor and because wheat-carting could be commenced straight away if desired. Wheat taken off with the stripper and left in heaps was often damaged by rain. The harvester could be used in damper weather than the stripper. Nevertheless, a farmer who had good strippers and a winnower should not discard them hastily, for should a few light crops of, say, 8bush. or less be experienced, they would be the best machines to use. In regard to marketing, experience had shown the standard 3-bush. sack to be preferable to the old 4-bush. bag. It was high time, in his opinion, that farmers made a better sample of wheat than at present. If wheat were marketed in bulk he thought the standard would be raised. Merchants dealing with the grain at the elevator would be better able to detect the presence of rubbish than they could now in the bags. The saving effected in bags would be considerable if the marketing in bulk could be arranged. The standard weight of wheat, he considered, was not altogether satisfactory, as there was no inducement for the farmer to clean his wheat so that it went above the standard. So long as it was up to the standard weight he obtained full market value. If it went under the standard he was docked in the price, and if over he received no more for it. The over-standard and under-standard wheat was mixed in the stack, and taking the stack as a whole it would probably reach the standard weight. In this way the merchant would sell the lot at top price, whereas the farmer who brought in the wheat above standard did not receive any better price for it. Thus the merchant received the benefit of the good wheat. A good general discussion ensued. Members were divided in opinion regarding the respective merits of stripper and harvester. Some said the stripper wasted heads of wheat which the harvester would retain; others that the harvester scattered seeds of weeds and so fouled the land. One member thought this a small matter where two years elapsed between the crops. Several speakers agreed with other portions of the paper, and all were of opinion that the Chapman sack was satisfactory.

Davenport, November 24.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Bothwell (chair), Holdsworth, Messenger, Hobby, Hogan, Roberts, and Lecky (Hon. Sec.).

HARVESTER v. STRIPPER.—Mr. E. H. K. Messenger read the following paper on this subject:—"Since the introduction of the complete harvester, a few years ago, there has been considerable difference of opinion as to its merits, compared with the stripper and winnower. The harvester is undoubtedly a wonderful machine, and is becoming very popular. Three years ago there was only one harvester in this district; last year there were four, and this year there are 16. This shows very plainly that it is gaining favor. I am strongly in favor of the complete harvester for various reasons. In the first place the wheat is reaped and cleaned ready for market with one operation. There are always a few damp and stormy days during harvest time; and the wheat being all ready it can be carted to market, thereby saving time that would be lost if it

had to be winnowed. The delay often caused when the cleaning operations are going on debars the advantage of immediate delivery. It is a great time and labor saving machine, and therefore a money-saving machine also. This is an important advantage over the stripper and winnower. It is the aim of every farmer to get the harvest operations completed as soon as possible; and the complete harvester is the machine to give him the best possible assistance. One man with a good harvester and the assistance of a lad to sew the bags will do just about as much work as three men and a lad will do with a stripper and winnower. Thereby a saving is made in the cost of two men, which is no small item. Besides this, it is not always possible to get men who understand the work and can turn out a good sample with the winnower. With the harvester one man is capable of doing all the harvest work. He is therefore independent of hired labor. Having finished the harvest, I would strongly advise the farmer to clean his machines and renew all broken or worn parts before putting them away. He should not wait until he needs them again and expect to get what he requires at a few hours' notice. Machines that have cost a lot of money are sometimes allowed to remain in the open, exposed to all weathers, until required for next season's work. Such carelessness ruins the machine and causes considerable loss to the farmer. The man who allows such a state of things to exist on his farm never knows in what state he may find his machinery, and consequently the defects are not noticed until he has a breakdown, which sometimes causes considerable delay and expense. In my opinion every machine should be under cover and cleaned after the season's work." In the discussion which followed Mr. Holdsworth raised the question of fouling the land. The harvester left the chaff and rubbish scattered on the ground. Mr. Messenger said an attachment could be procured for the International harvester at a cost of £3 which would prevent that.

Quorn, December 17.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Thompson (chair), Noll, Cook, Shulze, Brewster, Bury, and Patten (Hon. Sec.).

BLUE WEED.—Mr. Noll considered the blue weed, locally known as Salvation Jane, was too widely spread to be eradicated, and as stock would eat it proposed that the Carrieton Branch be supported in its efforts to prevent this plant being declared noxious north of Petersburg. The resolution was seconded and carried.

ADVERTISEMENT OF THE STATE.—Mr. Cook, who had just returned from a trip to England and the Continent, said that he was greatly surprised that South Australia was not more advertised in the old world. The other States were made known much more widely than was South Australia.

FALLOW.—Mr. Brewster thought it advisable to leave the fallow after ploughing for a month or six weeks, until a heavy crop of weeds had grown, say, 6 in. or 8 in. high. This ploughed under would be of more benefit as green manure than if fed to sheep. Mr. Noll agreed that in this district it was more profitable to plough the green stuff under than to feed it off, but he would grow clover or peas for this purpose. Other speakers held similar views, and Mr. Bury considered the plough was the best implement with which to work fallow.

Wirrabara, December 10.

(Average annual rainfall, 30 in.)

PRESENT.—Messrs. H. E. Woodlands (chair), W. S., E. J., and W. H. Stevens, Pitman, Bowman, Curnow, A. Woodlands, Borgas, Marnor, Blesing, Hendrick, P. and H. Lawson (Hon. Sec.), and four visitors.

PREPARATION OF LAND.—Mr. Bowman read a paper on this subject. Fallowing, he said, should be commenced as soon as possible after seeding, and should be finished by the beginning of September. He would plough the fallow to a depth of about 4 in., and would not have the shares take more than 8 in. or 8½ in. in width. New ground being broken for the first time should be ploughed about 7 in. deep to make a good surface soil to work on. Unless broken to a good depth the first time it was difficult to keep the plough shares under in subsequent workings. It was practically useless to crop land other than fallow unless it could be ploughed early enough for the weeds to grow and be killed with the cultivator before seeding. The seasons would not always permit this, and therefore fallowing was the only safe course. He preferred to cross harrow, and thought once across the ploughing was equal to twice along the way the plough had been.

The harrows should be fairly heavy and he would work deeply the first time. Subsequent harrowing was then comparatively easy, and even the troublesome stinkwort could be killed if taken at the right time. One acre of well-worked soil was at any time worth two acres otherwise. Sheep were useful to keep down weeds, but it should not all be left for them to do. Discussion followed. Mr. Lawson agreed with most parts of the paper, but thought from 4in. to 5in. deep enough to plough in this district.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Appila-Yarrowie, November 16.

(Average annual rainfall, 14½in.)

PRESENT.—MENSRS. Keller (chair), Francis, Daly, Borgas, Klemm, Wilsdon, Bottrall, Bortim, Powell, G. Klemm, and Heaslip (Hon. Sec.).

TAILING LAMBS.—A paper on this subject was read by Mr. Klemm. He had always been in the habit of tailing lambs with the knife and seldom had many losses, perhaps 2 per cent. or 3 per cent. Two years ago he tried searing irons. He made the irons himself as near as possible like those made by the inventor, and constructed a table upon which to seat the lambs. The two irons were heated in the forge with charcoal, and he had one man looking after the irons, two handling the lambs, while he himself performed the operation. None of the lambs lost any blood, and he cut over 300 of them in one line. Ewes and lambs were turned out and watched closely for a week during which time they seem all right. After nine days he found one lying dead, and it was evident that tetanus was the trouble. Next day two more were effected with the same complaint, and within three weeks 21 lambs were lost in the same way. The first sign of the trouble was walking stiffly, with ears sticking out straight. Examination revealed a hard scab on the tail, with a good deal of matter underneath. He brought in the whole flock and took the scab off each lamb's tail, after which only two or three more were lost. The value to him of lambs lost was £13 2s. 6d., based on the price realised for those that survived. He had since returned to the use of the knife, and was satisfied that it was the better instrument for this operation. Ewes and lambs should be brought in the evening before they were to be tailed, and then operated on in the morning, and in this way would bleed less than if brought in hot. Lambs should be tailed when as young as possible, say, from two to three weeks old. Members agreed that Mr. Klemm's experience went to show that the knife was quicker, cleaner, and more effective than a searing iron.

TETANUS IN FOALS.—Mr. Klemm wished to know the cause of foals dying with lockjaw. [This information will be found in the February, 1909, issue of the *Journal*, page 595, and also the means for prevention and treatment of affected animals.—ED.]

Mount Bryan, December 12.

(Average annual rainfall, 15½in.)

PRESENT.—MESSRS. Hatherly (chair), Wardle, Schmidt, Trallaggan, and H. L. Hatherly (Hon. Sec.).

PREPARING SHEEPSKINS FOR MARKET.—The Chairman read the following paper :—“The sheep should be killed in a clean place, so that the skin when taken off will not pick up any rubbish. Care should be taken not to let any blood run over the skin. Skinning should be accomplished within a reasonable time to prevent discoloration of the pelt. Avoid cutting the pelt more than necessary, but at the same time do not leave any flesh on the skin. Use the hand as much as possible. It is wise to lay the skin flat out for a little time, pulling out all the edges, after which it should be hung in the shade over a beam lengthways from breech to neck, or to ensure having the skin square and not wrinkled or damaged in any way; a better plan is to make a frame and hook the skin on to this. It can then be placed in the shade and will be kept free from wrinkles. When ready, skins should be marked without unnecessary delay and should be packed pelt to pelt or wool to wool.” A good general discussion followed.

Mount Bryan East, December 10.

(Average annual rainfall, 15½ in.)

PRESENT.—Messes. Gars (chair), F. and R. Thomas, Dare, Tralaggan, and Quinn (Hon. Sec.), and one visitor.

WORKING BULLOCKS.—A paper on this subject was read by Mr. F. Thomas. Bullocks were used extensively, he said, for dam-sinking, drain-making, wool-carting, &c., on Northern stations and on many farms. For ordinary work it was not advisable to use very heavy bullocks, as they were slow in action. At the same time they were very powerful and could not be beaten for heavy ploughing. In the ordinary way it was best to let the bigger animals put on some little extra condition and sell them, putting young bullocks in their places. For making a good-sized dam the bullocks should be worked four abreast, so that they could all be kept under control comparatively easily. On roads, however, it was not necessary to yoke them four abreast as they travelled better there than on dam work. The method of yoking up was then described, and swamp mallee was recommended for making yokes. This was very tough, and when dry was light. The wood should be 4½ in. square. If too small it would cut into the neck and hurt the bullock, so that he would be unable to pull properly. The yoke should be made with a good sweep for the neck, and be smoothed off with broken glass or a drawing knife. Start plates were needed, and the timber had to be bolted once each side of each neck to prevent splitting. Bullocks should be paired as evenly as possible in regard to strength. Where this was impossible the weaker bullock should be given the advantage on his side of the yoke. The bows should be bent and shaped to fit each neck, and must be neither too small nor too large. The paper continued—The strongest chains should always be placed behind and light ones in front. In pucking steers it is very necessary to get good doers, and good-footed cattle. The feet should be rather on the large side. The hind quarters should be strong, with big bone. Avoid having knock-kneed cattle. They had better be rather low set than too lanky, and the rump should be a little higher than the shoulder. The front quarters should be sturdy, and the animal should have a good, deep neck. The age for breaking in depends a good deal on the kind of work to be done. For road work, or working a mud scoop where the pulling is not solid, the young bullocks are fit for the yoke when about two and a half years old, but for solid work, such as dam-sinking, they should be three and a half years. It takes about two weeks' solid work before they take to the pulling in a proper manner, although, like most other animals, they vary a great deal. The simplest and most effective way of getting bullocks used to their places is to couple them together with a short piece of chain and two pieces of rope for their necks for about four days. It is necessary always to put the free bullock on the off side and the quiet one on near side, as the off side has more travelling to do owing to the calling round. The easiest way to break in young leaders is to put a young bullock with each of the old leaders. Let them take it in turns to go on the lead, and they will come to it after a while. If you have no old leaders a few lessons on the road is the easiest way to teach them. Always select good-tempered, good-footed, and free bullocks for leaders, and, above all, avoid using stags, as they never make good leaders; in fact, these are not a desirable class for body bullocks either. In regard to colors, red, red and white, roan, and brindle are about the best. White bullocks as a rule loose condition more quickly and pick up more quickly than others. Black is not a good color for selling. When calling round, make the near side bullock back, or it will be too hard on the off sider. The body bullocks should also be well educated. The steady bullocks should be placed behind and free ones in front. A bullock with horns has the advantage over a poly one in defending himself, and the horny bullock in bushy country can get his fill much more easily by breaking down boughs with his horns. In the yoke the poly bullocks have to be bowed tightly, as otherwise they get their heads out of the yoke." Members generally agreed with the views expressed in the paper.

Redhill, November 22.

(Average annual rainfall, 16½ in.)

PRESENT.—Messes. Lithgow (chair), Pilkington, Steele, McAvaney, Coffey, and Dunsford (Hon. Sec.).

THE NEED FOR A STUD BOOK OF DRAUGHT STOCK. The following paper on this subject was read by Mr. Coffey:—"Breeders of horses have a right to know what they are breeding from, and buyers have something to expect from sellers to satisfy them that their purchase is genuine. During the last five or six years horse-breeding in this State has assumed vast proportions. The big demand and high prices are of course responsible

for this. Previously it was more the rule than the exception to breed from very inferior stock. When, however, better prices ruled, it became apparent to most people that only the best of breeding and selecting would bring top prices. This has been the means of vastly improving the class of draught stock reared on most South Australian farms. Although we have effected improvements that as breeders we have reason to be proud of, we are still a long way from having a perfect system. Humanity, generally speaking, seems prone to wobble when it is a question of £ s. d., and when a little extra can be gained by not having a too sensitive conscience it usually follows that the conscience is given a sleeping draught while the owner is engaged in driving the best bargain he can. This failing in human nature is very often manifest amongst breeders and dealers in horse stock, and as a result stock are often listed for sale with a pedigree attached that would put that of their owner to the blush. The same elaborate pedigree will not in the least influence more cautious buyers, but by them is accepted with the proverbial 'pinch of salt.' Still, with hundreds of people it is taken as genuine. Would it not be possible to initiate some improved system in connection with pedigrees that would be more satisfactory to both parties? I say most emphatically, yes. In England there exist breeders' associations, and to these must belong all breeders of the distinctive breeds of horse stock. In connection with each association there exists a stud book, which is only available to the members of the association. The management have the right to grant a certificate to any animal whose breeding appears in this stud book. The members guard jealously their list, and should any fraud be attempted it would fail. The advantages to be gained by the formation of such an association must be plain to all. Let us look at the very best bred horses in South Australia at the present time. We can be pardoned for being sceptical regarding their pedigrees, seeing that they are in most cases without a foundation. I suggest that this matter be taken up by the Agricultural Bureau members. They might join with the different show committees, as the interests of both are along similar lines. With combined action there is no reason why a State stud book should not be established. Place the stud book under State control if it seems wise. If this were done, any certificate bearing the State stamp would be ample proof of its genuineness. The book on its introduction might prove unpopular, but in matters of this sort it is well to work on the principle of 'The greatest good to the greatest number.' Breeders, I feel sure, would welcome the innovation, because they would then be able to produce a pedigree which, bearing the official mark, no buyer need hesitate to accept. The only persons who would be likely to oppose the idea are the men who in the past did not hesitate to fake a pedigree when it paid them to do so. Just one instance of the trick sometimes played. A few weeks ago I chanced upon the pedigree of a supposed well bred animal. It gave names and dates right back very nearly to the stranding of the Ark, and eventually concluded by saying 'Vide Commonwealth Stud Book.' As such a stud book does not exist, further comment is unnecessary." Having discussed the question, it was resolved to ascertain whether there were any powers affecting the question under existing legislation.

Whyte-Yarcowie, November 19.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lock (chair), Hunt, Pearce, Walsh, M. Walsh, McLeod, Pascoe (2), Fulkner, E. M. and G. F. Jenkins (Hon. Sec.), and two visitors.

CARE OF HORSES.—This subject was introduced by Mr. M. Walsh. Proper attention should be given to mares, he said, from the time when they were first in foal. If half starved or overworked the foal would suffer. On the other hand it was unwise to allow the mares to get too fat, as there was more danger at foaling time if very fat. Mares should have steady work up to within a week of foaling, as this helped to keep them healthy and strong. Young horses should be well fed until fit for work. He thought the best chaff was cut from about two-thirds wheaten and one-third oats hay. The latter should be well forward, to give a fair quantity of grain. If there was insufficient grain he would add some oats and bran to the feed. Harness should be well oiled to lessen the liability to chafe the horses. Collars should only be used which fitted properly. If properly fed and cared for horses which were not overworked could be kept at it practically all the year through. Nevertheless, a short spell in the spring was of considerable benefit to them. In the discussion which followed members said a great deal more bran should be fed to horses than was usually the case. They considered that oats were of much more value to horses if they were scalded.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

Angaston, December 10.

(Average annual rainfall, 21½ in.)

PRESENT.—*Messrs.* Wishart (chair), Friend, Player, Swann, Sibley, Plush, Smith, Ball, Giles, Clark, Heggie, Salter, Matthews (Hon. Sec.), and three visitors.

EXHIBITS.—The Chairman tabled some fine samples of Nickajack apples, which had been in cold storage at Port Adelaide since May 5th. They turned out in splendid order. Some young pears were shown which had been badly marked and spoilt through the use of bluestone and arsenate of lead without lime. A very fine cut of lucerne was also exhibited, which was 3ft. high. It was grown by Capt. Collins at Gawler Park, and was the second cut produced without irrigation.

MURRAY RIVER LANDS.—Mr. Ball gave an interesting account of his recent trip to Wentworth, a brief summary of which is given. He remarked upon the evidences of progress since his last trip three years ago, more particularly at Ramco, Waikerie, and Loxton. At the last named place, three years ago, there were only a few scattered homesteads; now there was a well-laid out town, with substantial buildings, including a large hotel, an institute, a hospital, churches, bank, &c., and a double plantation of trees in the principal street. It riled a thinking passenger to see the enormous waste of the Murray water—thousands of millions of gallons running away to the sea. Any Government that carried out this much-needed locking work effectively would confer a vast benefit on South Australia and make the Murray Valley one of the most productive—if not the most productive—places in the Commonwealth. Above Renmark there was a decided change in the Murray banks. The alternate high cliffs and flats so characteristic of the lower river only occurred here and there, the prevailing character of land being rather low and fairly level, and mostly well timbered. Settlements were fewer, and one passed through new country that should be utilised for closer settlement. Wentworth itself was rather a disappointing town. The area was large, but the buildings were scattered and many were dilapidated. To his surprise the river did not appear to narrow as might have been expected, but right up to Mildura was a wide stream. Reference was made to a peculiarity of the backwaters. They fill gradually from the lower end, and as the river falls drain away gradually. This provision of nature prevents washing away of soil. The Wentworth irrigation area was very interesting and well worth a visit. The growth of all kinds of trees and vines was very prolific, and there was a marked freedom from fungoid diseases. It was considered by the settlers that this was due to the prevailing clear, dry atmosphere and higher temperatures. The area at Wentworth available for irrigation was estimated at about 7,000 acres, and it was likely the settlement would rival some of the older ones, as the soil was a deep alluvial and appeared to be especially suitable for orange-growing. Apricots, peaches, sultanas, currants were luxuriant, and at two years after planting were carrying good crops. Orange trees of same age were also bearing fruit, but not to the same extent. A visit was paid to the Pomona Estate, started this year with a capital of £50,000, and managed by Mr. F. Wilkinson, formerly agricultural editor of the *Sydney Mail*. The company had purchased about 1,200 acres of land and planted some 50,000 sultanas and 1,500 orange trees. The pumping plant was 80-horsepower, with 13in. delivery pipe. It was proposed to extend the planting and put down some 200 acres in lucerne. The venture was looked upon largely as an experiment, and the result would be watched with interest. The estate was situated on the Darling, about seven miles from Wentworth. Mildura was visited, but only briefly. The area under irrigation was about 12,000 acres, and the 90ft. channel—one of three in all—was some 40 miles long. The district appeared to be sound and prosperous, and the town had some fine buildings. Mirbeen (formerly White Cliffs), about halfway between Mildura and Wentworth, a newly opened irrigation area, was being rapidly settled and promised well. The railway had been extended from Mildura to this place, and a further extension to Yelta, opposite Wentworth, had been approved. The trip was a very enjoyable one in every respect; the *Gem* was a comfortable boat, and roomy and well found. The speaker strongly recommended the river trip to all seeking a pleasant, restful holiday full of interest.

Clare, November 11.

(Average annual rainfall, 24in.)

PRESENT.—Messes. McCarthy (chair), Patullo, Berridge, Bowman, Pryor, Keane, Jarman, Kelly, Maynard, Radford, Daly, Pink, McKenzie, Mayor, Forbes, Scales, Nolan, Kollosche, J. H. and P. H. Knappstein (Hon. Sec.).

WOOLLY APHIS AND BITTER PIT IN APPLES.—Mr. Pryor read the following paper:—
 “The woolly aphis, or American blight, as it is commonly called, is doing a lot of damage to apple trees in this district. When the trees are worked on blight-proof stocks the pest can be exterminated, but when not on blight-proof stocks it is laborious work trying to check it, and the blight follows right out to the extremities of the roots. Various sprays are used for the aphis or blight, but red oil has given the best results. One thorough spraying of red oil will exterminate it. Growers whose trees are affected with woolly aphis would do well to visit Mr. Froman's orchard at Penworthan, and see the good work done with red oil in combating this pest. A disease that has puzzled applegrowers for years is bitter pit. Some growers advise pruning lightly, while others say it is only to be found on low-lying ground; yet last year I saw a Cleopatra that had not been pruned for years, and I have never seen a tree so badly affected. At Watervale, in an orchard that stands on a high hill, some of the Cleopatra trees were badly affected. I have never known the disease in trees on limestone soil. I think this goes to prove that the trouble is in the soil—either an excessive quantity of moisture or the soil is lacking in something that the tree needs. Growers whose trees are affected with bitter pit should test the results of lime, or any manure that will act as an absorbent.” Discussion followed. The Chairman thought bitter pit was caused through overflow of sap, and advocated pruning the trees very lightly in the off season for fruit. He also advised the use of red oil as a spray for eradicating the woolly aphis. Mr. Jarman had used various oil sprays, but had not had the good results claimed for them. Mr. Bowman had come to the conclusion that all pests and diseases were much worse in a wet season than in a dry one, and he considered bitter pit was mostly brought about by the atmospheric conditions of a wet season. Mr. Nolan thought bitter pit was caused greatly through bad under drainage, and advised draining the land. Mr. Knappstein was of opinion that bitter pit was caused through some plant food being absent from the soil. He was experimenting with various kinds of manures in the hope of finding out what the trouble was. He quoted instances of fruit badly affected with bitter pit on trees growing near a very deep creek and on limestone ridges. That made him think the disease was not caused through bad drainage.

Watervale, November 25.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. E. E. Sobels (chair), C. and S. Solly, F., F. L., and A. Burgess, Ward, Davis, Parker, T. W. and V. Sobels, Hamp, Scovell, O. and P. Dunstan, Baker, and Duke (Hon. Sec.).

WHEAT DISEASE.—Several members referred to the mysterious manner in which many crops were blighted off. Mr. Hamp had noticed myriads of small insects infesting the plants which were affected. Some members observed that crops which had been fed down with sheep had escaped the disease. Mr. Parker recommended putting sheep on the young crop in damp weather, and quoted instances in which this had been an effective preventive of the trouble. It was also said that the soil should only be cultivated when moist. Some attributed the trouble to black rust. [If samples had been sent in it might have been possible to say definitely what the disease was.—Ed.]

WHEAT FOR HAY.—With a view to selecting the most suitable wheats for hay in this district, members tabled the following varieties: Tabled by Mr. F. L. Burgess—Yandilla King, which had been grown with 1cwt. super. on virgin soil containing sand. He estimated this crop at nearly 2 tons of hay per acre, but thought the wheat was better as a grain yielder. Also King's Early, sown under similar conditions in a limestone soil. He considered this was distinctly a grain yielder, but the hay was very sweet and nutritious, though the crop was a light one. Neumann's Early shelled out badly and would, in his opinion, pay better for grain. [?—Ed.] It matured early. By Mr. Hamp—Marshall's No. 3, Federation, Marshall's Hybrid, and a wheat grown from selected heads which members classed as Medeah. The latter was grown on chocolate soil without fertilisers. It stood well, bore a heavy flag, and had a fairly solid sweet straw. It appeared a good hardy wheat for hay purposes. Marshall's No. 3 had been sown late

after a crop of peas, and yielded well for all purposes. He considered it the best all-round wheat. Federation had suffered much from black rust. [Flag smut.—Ed.] At first it had grown vigorously, but later on it blighted off. It was sown on bare fallow with fertilisers, where there had been no crop for at least 19 years. Another sample of the same had done better on stubble land where a heavy crop had been reaped last year. Marshall's Hybrid appeared to be doing well as a hay crop. By Mr. Sobels—Beardless Gluyas, John Brown, and Baroota Wonder. The first was yielding well for hay and appeared to do well on limestone soil. He had no hesitation in pronouncing John Brown to be a splendid all-round wheat. The crop was about 5ft. high and the heads were very large. The Baroota Wonder seemed to do best on higher ground. It was about 4ft. high and had a plump grain. By Mr. S. Solly—Gallant, 4ft. 6in. high; Marshall's Hybrid, 4ft.; Yandilla King, 3ft. 6in.; and Medeah. He thought the last equal to any for hay, and that it was essentially a hay wheat. He considered also Yandilla King and Gallant suitable varieties for hay, while he had grown Marshall's Hybrid for many years for hay, and was well satisfied with it. By Mr. C. Solly—Marshall's Hybrid and Yandilla King. The first was a good rust-resister, and in his opinion was well suited to the district. He could confidently recommend the Yandilla King for both hay and grain in this locality. Mr. Hunter, who was unable to be present, sent a sample of Huguenot about 6ft. high. It had a heavy straw, nearly solid, with a decided pleasant aroma and a sweet taste, but it did not stool well. Members regarded this variety very favorably. All present were much interested and pleased with the exhibition and the information gained.

WESTERN DISTRICT.

Cummins, November 12.

PRESENT.—Messrs. Sabey (chair), Hall, Durdin, Scholz, Cooper, Nottle, Potter, Hamilton, Siviour, and J. Durdin (Hon. Sec.).

BREEDING DRAUGHT HORSES.—The Chairman read the following paper on "Horse-breeding":—"At the present time there is a great demand for good draught horses in the Commonwealth, and prices are advancing rapidly. With so much land being made available for farming the demand for farm horses must necessarily increase for a number of years. Therefore the breeding of good animals of this class should be a very profitable industry. From July 1st, 1909, to June 30th, 1910, no less than 1,343 horses were imported into Victoria from New Zealand. Of these 450 were geldings, 747 mares, and 146 stallions. The average selling price per head of geldings and mares imported for farm work was £48. Mares that were imported for stud purposes averaged £80, and stallions £200. This means that Victoria paid about £96,000 to New Zealand in one year for draught horses. This very large sum might well have been retained by the farmers and breeders of these States. The farmer might do a great deal towards keeping this amount here by exercising more care in the selection of the sire. If the mare is of medium quality and the sire good there is a chance of a good foal, but if the stallion is only medium the chance is very remote. If you want to breed £40 horses you should get a sire whose progeny is supposed to be worth £20, because even with the use of the best stallions there are numbers of disappointments. Medium horses are bred in large numbers even by the use of the best sire with medium mares. It is therefore folly to use only a medium sire with the mares that most farmers here have. It is said by some that the mild climate of our State is against horses attaining the size that they do in New Zealand, but I am of opinion that it is the haphazard way we have of breeding which causes the horses to deteriorate. Even though you have the very best sire it is possible to get the progeny is not going to be anything great unless the mare is well fed while rearing her young, and the young one itself is given all the feed it requires while growing." [Unfortunately no discussion is recorded by the Hon. Secretary upon this important subject.—Ed.]

Koppio, December 17.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Brennand (chair), Newell, Thompson, Barraud, Gardiner, and Richardson (Hon. Sec.).

SELECTION OF SEED WHEAT.—The Hon. Secretary read the following paper on this subject :—"There is not the slightest doubt that if farmers paid more attention to the seed they sow their returns would be increased. Seed wheat should in all cases be absolutely free from all foreign seeds, as every plant that comes up other than the crop sown takes up so much room and reduces the yield. But apart from sowing clean seed I think farmers could very well pay more attention to the selection of their own seed wheat, and as the time is now approaching when the wheat will be ripe this is a seasonable subject for discussion. It is evident that if we take some of the best heads from any variety of wheat, grade the seed from these and sow it, selecting again the following year from that plot, and so on, we shall improve that wheat and increase its yielding powers. To get the best results with stock we must use the best material available for breeding, and I do not see why this should not apply in the same way to wheat. Instead of having to procure a change of seed from some district, with every probability of getting some foreign weeds into the bargain, we should always have a pure sample of first quality seed available on our own farms. The process of selection is simple, and there is no reason why every farmer should not go in for it." The method of selecting was then quoted from Mr. Richardson's (Assistant Director of Agriculture) address, for which see pages 377-385, November, 1910, issue, and the paper continued—"Last year for the first time we selected some Marshall's No. 3 that we had been growing from the same seed for the last seven years. We took half a bushel, and to compare the two samples would have surprised anyone. The selected sample was far bigger and plumper grain and more even. This was sown beside some of the same variety, and the difference in the first growth of the two plots was surprising, although the two plots were sown under exactly the same conditions in every respect. The selected sample shot up a blade far longer and more healthy in appearance, and it grew much more quickly from the start. It also looked as though it had been sown at least 10lbs. to the acre thicker; this, of course, may have been due to the fact that it had not been through the stripper. The crop at present is more even and much thicker, and we intend to go in for selecting all the wheats which we grow in any quantity." Members commented favorably on the paper, and were of opinion that by careful selection wheat could be greatly improved. Mr. Barraud was in favor of procuring a change of seed from another district occasionally.

Miltalie, November 12.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. J. S. Jacobs (chair), F. Jacobs, W. G. and E. P. Smith, Ramsey, J. P., T. W., and E. Story, Alm, Kobett, Hier (Hon. Sec.), and one visitor.

GARDENS FOR FARMERS.—A paper to the following effect was read by Mr. Alm :—"It is a great pity that in a country like this so little interest is taken in gardening, a side line which would be of considerable value to the farmer. In these new districts we find it extremely difficult to get good fresh fruit. The long distance causes the fruit to deteriorate very much, but still we have to pay a big price for what we can get. How nice it would be to go into your own garden to pick the fruit which you had grown. I would select a piece of ground of a rich dark loamy sand several feet deep. Not on soakage ground, as this is too cold and wet in winter, and the roots are likely to rot. An orchard should not be very far from the homestead, as birds are bound to appear when the fruit begins to ripen, and if not checked they will do a great deal of damage, not in what they eat, but in what they destroy. The first work is to grub all the stumps, then with a good strong implement plough to a depth of 18in., or even more if the ground has a stiff bottom. This work will pay for the trouble. After the ploughing harrow well to leave a smooth surface. Soil prepared in this way will give the roots a chance to spread. If, instead of this, a hole of several feet square is sunk, the roots will not spread into the stiff soil. Consequently there will eventually be a mass of roots around the stem of the tree. Fruit trees should be planted in July, but before planting the holes should be made about 2ft. 6in. deep, and left open for several days for the sun and air to get in. Leave a mound in the middle of the hole about a foot square for the tree to rest upon to keep it from sinking. It is a mistake to plant trees too low, as they generally sink several inches when the soil sets down. It is advisable to mix a little stable manure with the soil when

planting. Great care should be taken to spread the roots evenly, and to have them dipping downwards. I would pick out a number of the best varieties of fruit trees. Have some early, some medium, and others late bearing. This should ensure fruit during the whole season. It is a mistake to let a tree bear to its full capacity in any one year. It will not have much chance to bear fruit the next year. If a tree is overloaded a lot of the fruit should be knocked off, and that will cause the remaining fruit to fill out well. This should be done soon after the fruit has set. In pruning, as much of the old wood as possible should be cut away. Keep the middle of the tree well opened, so that the sun and air can get in; otherwise the fruit will suffer. If planting vines, put in those that are rooted. They will bear fruit earlier than cuttings. As much care should be taken in pruning vines as with fruit trees. They should always be cut back enough to ensure a good growth for the coming year. Most vines can be worked on to a trellis, and will then bear to a greater extent than if left spur pruned. If there should be a vine which is not favored, it can be cut off a few inches below the surface of the soil, a fresh graft put on, banded up with grafting wax, and the soil replaced. This is better than replacing the entire vine. The garden will look at its best if it is treated with stable manure or fertilisers, and it should be irrigated if possible. A breakwind erected around the garden is a decided benefit. Various kinds of trees could be suggested for this purpose, but gum trees should be avoided, as they absorb too much moisture. If a gardener hopes for a good return he must work the ground and keep the weeds down. 'One year's seedling is five years' weeding' is a fact. I think it would be excellent if there were enough gardens here to have competitions for the best kept garden. It is done in different parts of the State, and has been working with good results. I hope the time is not far distant when everybody here will have his own orchard, and so make everything much more comfortable and pleasant." [Apparently no discussion took place. Surely the paper warranted some definite expression of opinion on the part of members.—ED.]

Petina, December 6.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. D. Kenny (chair), J. Kenny, Wharf, Bascomb, E. and W. Keeley, Doley, G. A. and G. Newbon, and Souter (Hon. Sec.).

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. E. Keeley.

TEAM FOR STRIPPER.—Mr. G. A. Newbon wished to know the best way to work four horses abreast in a stripper. Mr. Wharf recommended having the four-horse swing rather short, with a short chain on the shackle, as there was no room for four horses abreast if hooked too close to the machine.

SAND DRIFT.—Mr. Keeley reported having sown about 20 acres with rye to stop the sand drift. The attempt was quite successful and the crop looked splendid. It was decided that at the next meeting to be held in March members should bring statements showing the yield of their crops, so that the best varieties for the district might be determined.

A WELCOME.—The opportunity was taken at this meeting to present to Mr. Keeley an address expressing the gratification of members on his return from his trip to Ireland. Mr. and Mrs. Keeley were also thanked for their kind hospitality extended to the members of the Branch on this occasion.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Geranium, December 10.

PRESENT.—Messrs. Mitchell (chair), M. and F. Alford, Lock, Wendelborn, Chaulton, Blatchford, Leahy, Lang, and Pannell (Hon. Sec.).

MARKETING WHEAT.—The following paper on this subject was read by Mr. F. Alford:—"Farming does not end with the production of good crops. They must be marketed to the best advantage. A difference of a few pence per bushel amounts to a considerable

sum on a large quantity of wheat, and may mean the difference between profit and loss. The market is necessarily ever changing, being determined by the supply and demand, primarily in the old world. The exportable surplus of the Commonwealth has as yet but little influence in affecting the world's market, and consequently we reap the benefit when the crops in Europe and America fall short. Good seasons are always welcome, but when coupled with big prices the farmer is in clover. As our prices are invariably based on the European market, the margin allowed for freight, insurance expenses, and profit by the local merchant is often considered too large. But the merchant must have some return for his capital and risks taken. His profit on trading—buying and selling—is very small. It is only by speculating that the merchant is likely to make big profits—selling for a lower market to buy in, or holding for a higher market to sell in, just as the majority of farmers do. The strong spirit of competition is a guarantee of a fair deal, while the Farmers' Union is a safeguard that must commend itself to growers. The Union's balance-sheets give sufficient evidence that wheat-buying is not so profitable as some believe. They buy and sell under the same conditions as the merchants, and might well say that the farmer gets the best of the deal. The honorable understanding caused an outcry, but it was never proved to be prejudicial to the interests of the producers. It was likely to have been more beneficial than otherwise. Keen competition was eliminated, and the trade conducted on safe lines. The margin of profit was recognised and the farmer got a fair deal. When competition becomes too keen the merchants must suffer first, but it all reacts finally on the grower. The difference that exists between the Adelaide prices and those of Melbourne and Sydney is often the cause of comment and dissatisfaction. The explanation, however, is simple. Cheaper freights, better wharfage facilities, more expeditious methods of handling the grain, and weighing in bulk more than make up the difference. It is strange that while the central State is recognised as the wheat State, weighbridges are not put down at all the stations, as they are in the eastern States, so that all wheat could be weighed in bulk without handling each bag over the scales as at present. The fixing of the standard bushel always calls forth criticism, but principally from those who do not understand the matter. It is imperative to have a buying standard, and the higher that standard is the more money wheat of that quality will realise. It is a grave mistake for a farmer to argue that it does not pay him to clean his wheat well, so long as he can get it passed as f.a.q. Without realising it, he is helping to lower the standard, thus reducing the normal value. Very few agents will dock wheat which is under the standard unless it is altogether too bad. This is counterbalanced by fine samples that are above the standard. As a matter of mutual advantage it will pay all farmers to strive to maintain a high standard. This will result in a small increase in the price, sufficient to more than repay any little extra trouble. One of the drawbacks the merchants have to contend against is the competition among agents which leads to practices that are virtually dishonest. Many agents on getting advice to reduce their limit will buy up all the wheat they can at the top price, thus defrauding their employers of the difference. Three years ago, when the market reached an abnormally high level it collapsed suddenly, dropping 3d. at one time. After advice, thousands of bags were wrung in on the merchants at the top price, involving thousands of pounds' loss. Some farmers not only encourage, but expect agents to do this for them. Loss of patronage is the reward for honesty, as some other agent will take the business on. One consequence of this practice is that stored wheat cannot now be sold without first advising the head office—a provision enforced to safeguard the merchants. Apart from the lack of up-to-date facilities for handling wheat, the method of buying and storing in vogue in this State has much to commend it. A farmer can sell forward in any quantity with reasonable time for delivery. He can also sell on delivery, or store and sell when he likes. The system of storage frees the farmer from all risk of damage, and permits him to get his wheat out of the way. It also gives him an opportunity to speculate and gamble. Most farmers are speculators nowadays—holding for higher prices. It is here that judgment and discretion are necessary. The whole principle of trading would be upset and unworkable if a farmer were in the "know," as he fondly wishes he were. The future must necessarily be left to conjecture. If the farmer sells at top price he calls it good judgment; if the market beats him, it is bad luck. Judging from the average experience, it is doubtful policy to always hold for a higher price if wheat is already quoted at a payable price, more particularly if the holder is not in a position to hold indefinitely; otherwise he may be forced to sell when wheat is at its lowest. It is safe only to speculate with the wheat that represents clear profit and is not required. A safe plan to adopt, which will invariably pan out satisfactorily, is to sell a third forward, more on delivery, and hold the balance, using judgment and discretion in each case." In the discussion which followed it was said that 3s. 6d. per

bushel was a payable price for wheat grown on cheap land. Some members spoke highly of weighing wheat in bulk, and it was said that a correctly balanced weighbridge would register as correctly to a pound as would a pair of scales.

Parrakie, December 10.

PRESENT.—Messrs. H. Heinzl (chair), O. Heinzl, Dayman, Morrisson, Hall, Neindorf, Burton (Hon. Sec.), and four visitors.

FOLLOWING SCRUB.—Mr. Neindorf read a paper on "Following New Scrub Land." He recommended ploughing in August and September with a share plough to a depth from 3ins. to 4ins., leaving the soil in a rough condition, and then letting it lie until well beaten down by the rain. When it began to drift, which it usually did after heavy rains, it should be worked with a cultivator or an old scarifier. Harrowing this class of land was not necessary in the spring, but it should be done after harvest to work out any of the stumps which were near the surface. The biggest stumps should be heaped up and burnt or carted off the field. The shoots could then be cut and horse-raked with the remaining small stumps into rows and burned. This would leave a nice clean seed bed. Members thoroughly agreed with Mr. Neindorf's views in regard to this matter.

MALLEE SHOOTS.—A short paper on "The Destruction of Mallee Shoots" was read by Mr. Heinzl. He would work the land well with a share plough and then send the fire wherever it would travel. After this, he would burn, with the aid of a fire-rake, any parts that were left. He would keep this up for three years, cropping with wheat meanwhile, and then would sow oats. Oats would grow well after wheat, and would not be affected by "takeall." In the event of any mallee shoots appearing after this he would have another good burn, and by this time practically everything would be killed. He had tried using the log, but was dissatisfied with the work done, and the slasher was altogether too slow. The disc plough also, he thought, had little permanent result as far as mallee shoots were concerned. [Unfortunately, members did not express any opinion in regard to this important matter.—Ed.]

OATS AND BARLEY.—The Hon. Secretary reported that Mr. Burton, of Parrakie, had reaped a crop of Algerian oats averaging 35bush. to the acre, and one of Cape barley going 40bush.

RAINFALL.—The rainfall for Parrakie to date was reported to be 18.20in.

Renmark, November 14.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. Waters (chair), Smith, Taylor, Nuthall, Wilkinson, Pike, De Witte, Smeaton, Everard, Geneste, Huggins, Cole (Hon. Sec.), and two visitors.

HINTS TO VINEGROWERS.—Mr. Lowcay, the Inspector under the Phylloxera Board, attended this meeting, and, in reply to a number of questions, gave the following information:—*Vineyard Cultivation.*—With respect to the care and general condition of the Renmark vineyards, Mr. Lowcay remarked that on the occasion of every visit paid by him during the last 10 years or so, he had observed a gratifying improvement in the way the vineyards were looked after. With a few rather deplorable exceptions this was true of the whole settlement. This year the vines were looking better than he had ever seen them. The Gordos and currants were carrying a maximum crop, and the sultana crop was a good medium one all through. In general care the blocks would compare very favorably with those of other districts. *Vine-topping.*—The topping back of vines was not approved by Mr. Lowcay. It was not practised in the vineyards down south, and during the 10 years he spent in South Africa (where the topping of vines was once universal) the practice had been given up during the last five years of his residence there, with no diminution of crop. In France topping had been abandoned 25 years ago, and the "Frenchmen study their vines more than they do their wives." Mr. Waters stated that he had been cutting back his currants under the impression that it would help the setting of the fruit. Mr. Smith said that topping the Gordo (once very general in Mildura) had pretty well gone out of fashion. Sultana vines, however, were improved by the removal of barren shoots during the summer, with which Mr. Lowcay quite agreed, as also with a statement by Mr. Taylor that pinching back was necessary to induce a good setting in certain varieties, such as Grenache. *Oidium.*—The common and chief cause of oidium was dampness. He was unable to account for an incident reported by Mr. Rogers, who stated that oidium had developed in vines which had not yet been watered this year,

whereas other vines in the same vineyard, which had been under water all the winter, were quite free from it. A few years ago he had found "cottony" oidium very bad at the Crescent in vines which had had their roots in water for a long time, and he had found various traces of the ordinary *Oidium Tuckerii* during his recent inspection, but had seen nothing to give any occasion for worry. Sulphuring, to be effective, should be begun when the shoots of the vines were from 3 in. to 4 in. long, and repeated at the flowering stage, and again when the grapes were the size of peas. The sulphur was best applied with proper bellows, as in this way the under side of the leaves, where the oidium first appeared, was reached. The best time to apply the sulphur was early on a dry, calm morning. Mr. Rogers stated that Mr. H. E. Olorenshaw last year used a spray of ammoniacal solution of copper carbonate for cottony oidium with very satisfactory results. Mr. Muspratt had been trying numerous experiments this year. He had found the Woburn paste useless, but seemed to be getting very good results from a spray of boiled starch. Excellent bellows, in the shape of torpedo sulphurators, costing only 50s. apiece, were procurable. Mr. Lowcay said that the winter swabbing of vines with copper sulphate and sulphuric acid solution had been found of great value as a preventive of oidium in the great Constantia vineyard in South Africa. It was only necessary to swab the new wood. The torpedo sulphurators were used throughout France and Germany and other European countries. Mr. Rogers said that Mr. Muspratt had had better results from the use of gypsum and sulphur than from sulphur alone, and Mr. Lowcay remarked that this mixture was being tried at McLaren Vale, Clare, and Angaston. The gypsum had to be heated before using. He had had no practical experience of its value or otherwise. He had never seen the Renmark vineyards so free from diseases and pests of all kinds as they were at present. *Phylloxera*.—In reply to questions Mr. Lowcay described the method of procedure which the Phylloxera Board had decided should be adopted in the event of phylloxera being discovered in any vineyard in South Australia. The phylloxera had been introduced into France from England on the roots of a Virginian creeper, brought to England as a rarity from America, and it had been taken to the Cape on the roots of rose plants. The opinion was freely expressed by members that Renmark settlers were incurring grave and needless risks by the importation of nursery stock from Victoria in view of the prevalence of phylloxera in that country.

Sherlock. November 24.

(Average annual rainfall, 15 in.)

PRESENT. --MRS. Wyatt (chair), V. A. and C. J. Osborn, J. P., C. E., and A. E. Tonkin, Stringer, Coombe (Hon. Sec.) and six visitors.

POULTRY FOR EGG PRODUCTION.—Mr. Trezona's paper on this subject was read by the Hon. Secretary as follows:—"For successful poultry-raising the houses must be warm, but built so that the birds have plenty of fresh air and light. Both the sheds and yards should be on high ground, so that the water will not lodge in them. Make a yard in front and another at the back of the fowlhouse, so that while the birds are in one yard the other can be turned over and planted with green fodder such as kale, clover, or lucerne. Of these three I prefer lucerne, as it is a fast grower and goes a long way to keep the birds in good health. A more serious item is that of selection of breed. White Leghorns have the lead in the majority of egg-laying competitions, and for this reason I prefer them. I would buy half a dozen pure bred pullets from two or three of the most prominent breeders and put each bird in a separate coop or small house. When they begin to lay keep an account of the number of eggs each one lays in 12 months. A hen that lays from 200 eggs upwards in the 12 months is suitable to breed from for egg production. These hens mated with a vigorous cockerel about two or two and a half years old, of a tested strain, ought to produce the class of layers we are looking for. As White Leghorns are very untrustworthy sitters I prefer an incubator for hatching. The chicks should be kept indoors for at least two days after hatching, and can then be put in the outdoor brooder and allowed to have plenty of fresh air. The feeding of chicks is a very delicate matter. I give a little pollard mixed with warm milk five or six times a day for the first week. After that, chaffed greenfeed and crushed grain, such as oats or wheat. When they are a month old they may have the same food as the laying hens. For layers I give a warm pollard mash mixed with chaffed lucerne as a substantial morning meal. A handfull of chaffed greenfeed to each hen is a good midday meal, and wheat or barley for the evening meal. The birds must have access to plenty of shell grit or old mortar, because they cannot lay a large number of eggs without the material with which to make the shells. To be kept in good health the hens must have plenty of exercise. This may be

secured by having a quantity of straw in the yards. All grain and chopped green stuff should be thrown into this, so that the birds to get a meal must do plenty of scratching. By following these methods one could produce a good laying strain." In the discussion which followed the majority of those present favored the incubator, but several thought better results could be obtained from broody hens. A member wished to know why chicks were not fed for two days after hatching. The Hon. Secretary explained that chicks absorbed sufficient food from the egg just before hatching to carrying them over the first day or two.

Sherlock, December 10.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Whyatt (chair), C. J. and V. A. Osborn, Arbon, Stringer, J. P., C. E., and A. E. Tonkin, Coombe (Hon. Sec.), and 13 visitors.

HARVESTING.—The following paper, written by Mr. V. A. Osborn, was read by the Hon. Secretary:—"It is important to thoroughly overhaul the implements, harness, etc., to be used during harvest, as this saves time and money, and often prevents serious accidents. The hay harvest comes first, and although we are unable to go into this as our friends in the Lower North do, we can cut enough for our own use. In this district it is wise to prepare as much land for hay as is required and plant a good hay wheat. Grub all the stumps out and cart off all the stones. This gives a lower cut and will save the implements considerably. I prefer the binder to the mower and horse rake, because it saves so much time in handling. With the binder, also, we do not get sticks and rubbish in the hay, as with the mower and rake. Immediately after cutting the hay should be stooked. This retains all the nutriment, and horses eat it more readily. I think the best time to cut is just after the flower or pollen has fallen. Oats should be left until the grain is forming. If cut very green oaten hay is bitter, and stock will not do well on it. The chief part of the harvest in this district is gathering grain, and for this work I prefer the damp weather stripper. It makes a good sample of wheat, it is lighter than a harvester in draught, there is less wear and tear, and we are able to save the wheat chaff—a consideration to pioneer settlers. The stripper also has very little to get out of order, and that is also a consideration, as we cannot get duplicate parts for machines in less than two days in this district. For the farmer with a thousand acres or more to reap I advocate using pony strippers and a motor winnower. The motor need not be idle from one harvest to the next, but it can be put to many uses, such as chaff and firewood cutting. The pony strippers can be worked by a youth, with three light horses, and will stand our rough land better than the heavier and more complicated machines. After wheat harvest is finished it is a wise policy to cut a stack of straw. It should be placed in a grass paddock so that stock will have free access to it during the winter months. Federation wheat straw and barley straw are most suitable for this purpose. All haystacks and chaff heaps should be covered before the first rains if possible." Discussion followed. Mr. Whyatt supported the writer in regard to grubbing out stumps on the proposed hay ground, but was opposed to feeding cocky chaff to horses. The majority favored feeding cocky chaff, with pollard and oats added, giving long hay at night. Mr. Coombe thought the mower and horse rake more suitable for this country, except where the land had been grubbed. Although a considerable amount of sticks, &c., were collected, the horses did not eat these. Where the hay had to be chaffed, sheaved hay was preferable. The binder was too complicated for this rough land.

Walkerie, December 19.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Boroughs (chair), Rogers, Burton, Lewis, Morgan, and Green (Hon. Sec.)

SULPHURING DRIED FRUIT.—This subject was introduced for discussion by Mr. Rogers, who viewed with alarm the passing of legislation to prevent the sulphuring of fruit. He was of opinion that there was nothing injurious in the process, and he thought the restrictions referred to would spell ruin to the present growers, while more recent settlers would not know what to do with their land. Mr. Green said that so far as he knew there had never been any practical tests to show what amount of sulphur would be injurious, nor did he know of anyone suffering from the effects of sulphured fruit. Mr. Rogers was of opinion that those engaged in the process of sulphuring fruit benefited in health.

Commenting further, Mr. Green said that very little sulphur was left in fruit after the exposure to the sun's rays, and finally it was resolved—"That, in the opinion of this Branch, 1lb. of sulphur to 100 sq. ft. [?] is not injurious to health, and this Branch supports the Renmark Branch in endeavoring to remove the existing restrictions." [The best authorities on the subject say that 1lb. of sulphur is sufficient for each 250 cub. ft. of space.—ED.]

SOUTH AND HILLS DISTRICT.

Cherry Gardens, November 15.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Stone (chair), T. and A. Jacobs, C. and J. Lewis, Kayser, Ricks, Hicks, Broadbent, Chapman, Curnow (Hon. Sec.), and four visitors.

AFFORESTATION.—A paper on this subject was read by Mr. J. Kayser. He said that big works such as jetties, bridges, and mining industries, in their ever increasing demands for timber, had resulted in the disappearance of practically all the forests in South Australia. Supplying firewood to cities and towns had also helped to denude the country of timber. Efforts had been made by the Government to plant forests and, to an extent, replace the timber cut down. A great deal of timber had been cut down by men who were only prepared to consider themselves and took no thought for generations to follow. Private owners did very little to replace the timber which was cut down to make way for cultivation. It was doubtful whether people were fully alive to the influence of forests in modifying the extremes of climate in summer and winter. Leaving lands exposed without timber resulted in erosion of the land and, in places, torrents of water. Fallen leaves and the bark of trees in certain parts kept the soil in such a physical condition that moisture slowly drained from the higher to the lower lands, resulting in springs and useful watercourses. The shortage of the world's timber supply would affect Australia as much if not more than European countries. It had been clearly demonstrated that in South Australia various trees of the pine family would thrive and could be grown to such a size as to be of commercial value to the State. Mr. Kayser then read extracts from a report on the subject by the Conservator of Forests, and proceeded to say that South Australians were in duty bound to face this problem and adopt a most vigorous system of afforestation. South Australia imported £200,000 worth of timber every year, and in 1908 the Commonwealth paid £2,000,000 for the timber brought to its shores. Germany employs 1,000,000 men in the forests, and 3,000,000 men were employed indirectly. He then read cuttings to show the tremendous demand for timber for making paper, turpentine, oils, and essences. In the discussion which followed Mr. Ricks thought that too much could not be done to replenish the timber supply in South Australia. He considered more experimental work should be done to test the length of life of the various pines now planted when grown under various conditions of soil and situation. He had an insignis pine growing on the top of a stringybark ridge, which, when first planted, made unusual growth. It had now reached a height of 40ft. and was showing signs of die-back in the top. Last year it had shed about 28lbs. of resin. It would be useful if settlers could know what variety of pine would live to grow to useful timber on similar soils. Mr. Jacobs thought that the pine referred to had been killed by being over-stimulated with fowl manure. Fowls had been allowed to roost in the tree for a number of years. He strongly supported a progressive policy in afforestation. Mr. Curnow thought a cheaper system of afforestation could be adopted if the department would stick more to the natural timbers. The hills south of Adelaide were the home of some of the finest hardwoods in the world, and in paddocks where sheep and cattle were not admitted, and old useless trees had been removed the young eucalypti of various kinds would spring up in thousands. He thought the present system of clearing and ploughing too slow and costly to keep pace with the demand for wood. Mr. Jacobs agreed that more attention should be given to gums than to pines.

CROVER.—Mr. Ricks tabled a fine sample of Italian crimson clover. He considered it the most promising of all the fodder plants he had experimented with, and found that it grew well on poor stringybark hillside soil.

POOR SETTING OF FRUIT.—Mr. T. Jacobs and others commented upon the complete failure of the fig crop. The Hon. Secretary stated that nearly all kinds of fruits were setting poorly this year, apples being particularly light. Some varieties, such as Irish Peach, Stone Pippin, and Rome Beauty had set better than others.

Clarendon, December 12.

(Average annual rainfall, 33½ in.)

PRESENT.—Messrs. Matthews (chair), Hilton, Shierlaw, A., H. E., and A. Harper, Dunmill, White, Spencer, and Phelps (Hon. Sec.).

CROP REPORTS.—Members' reports concerning their crops were of an encouraging character. In most instances the crops on land previously under peas were superior to those on fallow. The excessively wet season had been responsible for considerable damage. Members intended to plough as early as possible after the harvest. It was reported that fruit trees were blossoming out of season, and members said that last year's late bloom had affected this year's bearing.

EXHIBITS.—A sample of Bluebeard wheat was shown, said to be a wonderful cropper, both for hay and grain—grows to a height of about 6ft. and yields from 40bush. to 60bush. per acre; also a sheaf of Huguenot hay about 6ft. in height, very green, with well-developed heads. This was highly spoken of, but Mr. Harper said his horses and cows did not care to eat it.

Hartley, November 22.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), Brook, Hudd, Pratt, Symonds, O. Wunder-sitz, and Bermingham (Hon. Sec.).

FIREBREAKS.—It was considered that on account of the abundance of grass everywhere, more especially on the roads, all homesteads, haystacks, sheds, &c., should be protected from fire by clearing around them. Ploughing or cultivating was considered the best break. Some had already done this, but those who had not done so, and could not now plough, should harrow a half chain wide, going over it enough times to break the grass off, when it would soon blow away. If the ground was fairly level an old railway rail would break the grass off very well. It was pointed out that if a fire got a start anywhere about here on a hot windy day, the consequences would be disastrous. No one could be too careful, and all should see to it that the provisions of the Bush Fires Act were strictly adhered to in the district.

Longwood, November 19.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes (chair), Roebuck, Vogel, Quinn, Nicholls, Pritchard, Glyde, Coles (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—Members met at the homestead of Mr. Vogel, and proceeded to inspect the garden. The apples had suffered from the cold weather, and as the result the crop would be small. The foliage also had been injured by fusieladium. The green-feed, hay crops, and various grasses were coming on splendidly. A plot of crimson clover, cow grass, and rye had been cut twice, and would probably produce another good yield. After tea had been partaken of as guests of Mrs. Vogel, members turned their attention to detail business.

MIXED FARMING IN THE HILLS.—The following paper on this subject was read by the Hon. Secretary :—" Having a heavy rainfall and being well watered, land in the stringybark ranges is suitable for growing a very wide range of farm and garden produce, and a man can start with less capital than in any other part of the State. Almost every week something can be planted, and something ought to be harvested. It is a mistake to have too small a holding; 80 acres is a fair area, and under a methodical system of mixed farming will prove profitable. On smaller holdings stock cannot be kept to the best advantage. The productiveness of land can be improved more quickly and at less cost by judicious treatment of stock than by any other method. Hand feeding stock may mean small returns in the beginning, but as years go by there will be increased revenue and a lower cost of production. To manage such a farm one should keep records to estimate the cost of producing, to a pound of bacon or butter, or to a dozen eggs. It

will be well to have five or six acres cleared, drained, and well tilled. Some for orchard, some for a vegetable garden, and some to experiment in finding out the best foodstuff for stock. When fences are erected, invest in three or four cows and say three pigs, and for each additional acre brought under cultivation add one cow and a pig. In addition to what the cows may pick up, I recommend for each good cow in full milk 10lbs. oaten chaff, 2lbs. flour, and 3lbs. of bran each day, prepared as follows:—Mix the chaff and flour in a watertight bin eight hours or more before feeding. Pour on sufficient boiling water, in which 1oz. of salt per cow has been dissolved, to thoroughly damp the feed, and stir it well; then cover closely with bags and use at milking time, adding the bran dry. This is a daily ration, and half should be prepared after each milking. The ration will be modified as the green feed comes on. The time occupied in daily attention to six cows and four pigs will be three or four hours; and, roughly speaking, the cost of the first-named ration will not exceed 5s. per cow per week. In full milk they should give from 8lbs. to 10lbs. of butter per cow each week. As the milk eases off, which must be noticed by daily weighing, so decrease the ration or substitute something grown on the farm. This ration is to tide over until the farm crops are ready, and for passing from one fodder to another. Some such method will prevent any evil effect of too sudden a change of diet. In cold, wet weather I would house the cows in comfortable sheds having good brick floors. Provide bedding, and endeavor to have grass hay in the racks, to occasion some effort for the cows to get a little food at a time. The value of the manure gathered will be considerable. The number of cows kept will depend upon the management and arrangement of the feed. I would recommend one calf and three pigs to four cows. This will leave five or six hours daily to devote to further clearing and cultivation. In the early part of my experience in dairying I tried the first-named ration with 10 cows, and the result for one year was as follows:—Revenue from butter (2,673½lbs.), £130 1s. 1d.; household milk, £2 14s.; additional value on cows, £5 15s.; calves, £17; total revenue, £155 10s. 1d. Cost of food, £53 16s.; rent (332 acres), £30; total expenditure, £83 10s. Balance to profit, £71 14s. 1d. It will be seen that the cost of butter was over 8d. per pound. The next year I could have kept double the number of cows, and had I grown green and summer feed the cost would have been much less. The separator milk was given to calves, but would have been more profitable if fed to pigs with the buttermilk." Discussion was deferred until next meeting.

Mount Pleasant, December 9.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Giles (chair), Vigar, Godfree, Tapscott, and Maxwell (Hon. Sec.).

ROOT CROPS.—Discussion took place as to whether it was advisable to transplant root crops. Mr. Tapscott thought no root crops should be transplanted, but Mr. Giles quoted a grower who was very successful with transplanted crops.

SELECTION OF SEED WHEAT.—Following on the reading of an address on this subject, which is printed on pages 377 to 385 of the November, 1910, issue of the *Journal*, members agreed that it was important to select the best heads for seed, and so try to improve the yield.

FRENCH WHEATS.—Samples of the French wheats, Sensation and Red Marvel, imported by the department in 1909, were tabled by Mr. Giles. The first year the excessive wet had spoilt the crops, but this year they had done much better, particularly the Sensation.

REPORTS.—Members reported that they had never seen stock in better condition than at present. The crops would be poor on account of too much moisture. The rainfall for November had been 1.23in., and for 1910 to date, 31.45in.

Port Elliot, November 15.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. Chibnall (chair), Pannel, Brown, Gosden, Green, Welch, V. G. and W. W. Hargreaves (Hon. Sec.).

NITRATE OF SODA.—Following on the reading of a newspaper cutting, Mr. Green said that he had treated a crop of barley with nitrate of soda and reaped 42bush. of grain to the acre, but after this the land would not grow anything for seven years.

DISEASE AMONG YOUNG PIGS.—Members reported the loss of several litters of pigs, and it was decided to ask the department if the cause of the trouble could be explained.

SOUTH-EAST DISTRICT.

Frances, December 10.

PRESENT.—Messrs. Carracher (chair), Meechan, Watts, Tompkins, Foster, Chittleborough, and Atkinson (Acting Sec.).

HORSE-BREEDING FOR FARMERS.—The following paper on this subject was read by Mr. E. L. Atkinson:—"For farm purposes in this district a draught horse should not be more than 15½ hands high, and should be of the Clydesdale type. The main object is to breed for strength. The horse must not be 'flat-ribbed,' but should show plenty of muscle, and measure well round the girth. Small-girthed horses are usually weak, and also bad doers. The type we want will have the circular hoofs, will be brown in color, and will have black points. These markings are generally considered best. At the present time there is no more profitable investment for the farmer than to breed from roomy, well-proportioned draught mares. The progeny from such animals—provided they have been well fed and kept growing all the time—at 3 years of age should realise an average price of £40 to £45. Thus it will be seen that three or four young draught stock sent into the sale ring annually will return big profits. Breed good stock, and a satisfied buyer will come again and may bring another purchaser with him. Good draught stock sell easily, and command big prices. For breeding purposes it is safer to pay a few pounds more for a mare that has proved to be a good breeding mare than to buy one on chance, because in some cases high-priced, untried mares turn out quite unsuitable for breeding purposes. Really good breeding mares, although costing a good deal of money, by means of their first-class progeny will soon repay the outlay, and the owner will have laid a solid foundation from which to start a good stud. On the other hand, unless a good start is made on proper lines success is very doubtful. It will pay better to start with one well-bred draught mare and obtain the services of a good stallion that has proved himself an honest worker and sure sire than to start with a stallion of ordinary type and mares of the same class. Draught horses in this district require to be well fed for 10 months in the year, but if well rugged and stabled they will require less feed than otherwise. Brackish water may be considered the horse's natural tonic, and where this is not obtainable lime, salt, or sulphate of iron in small quantities should be added to the drinking water. This has many advantages over rain water for watering horses." A good general discussion followed, in which the main points touched upon were agreed with by those present.

Kalangadoo, November 12.

PRESENT.—Messrs. Crouch (chair), Riddoch, Gibb, Mitchell, Earle, Bennett, Boyce, Hunt, Hemmings, Rake, S. and W. D. Tucker, Sudholz (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—Members met at the homestead of Messrs. S. & W. D. Tucker, and proceeded to inspect the stock and crops. The first sheep inspected were two-tooth Lincoln ewes by McArthur rams, of enormous frame and weighty, with great fleeces, and some splendid woolled Comebacks of mixed sexes; also very large. This line, so densely woolled, with fine staple, was by Koorine rams out of crossbred ewes of their own breeding. Such gave the best results, as they obtained the quality from the rams and the staple from the ewes. They found the Koorine rams the most suitable for such breeding, as the wool is not so hard as from northern rams. All the fleeces examined on these sheep were clean, dense, and fine. Whilst walking across the grass lands the outlook in all directions was beautiful, the spring weather having forced the grass forward. The first crop inspected was sown for hay, and comprised a mixture of Algerian oats and Comeback wheat. This was drilled in during the third week of May—about 2bush. of seed per acre with 70lbs. of super. B—and was the eighth crop in rotation. It was heavy and forward, and looked equal to 3 tons per acre. The next paddock had a healthy looking crop of Comeback wheat, drilled in with 90lbs. of mineral super. in July, and grown on potato land. This was thick and rank, and was expected to yield well, although it was not yet out in ear. A nice crop of Algerian oats was noticed in the paddock adjoining. This was drilled in with 70lbs. of super. B on July 26th, and at present was thick, even, and clean. Next was a paddock sown down with rye grass about three years ago. It was now looking splendid, with a large number of fat sheep grazing upon it. This paddock carried seven sheep per acre from March till December in 1909, and the sheep when fat averaged 12s. 6d. per head when sold. Another good crop of Comeback was then inspected. This was the second crop of wheat on this land. Half had been drilled in with 80lbs. of super. B and half with the same quantity of mineral super. At the time of inspection there was no apparent difference. On the opposite side of the

fence was a beautiful crop of field peas. Mr. Tucker drilled in about 2bush. per acre, with about 70lbs. mineral super. on the 28th August. This crop was quite an object-lesson, and was considered by one visitor to be equal to any crop of peas growing about the hills nearer the city. It was then about 18in. high, and as thick as it was healthy. This paddock had been sown down with rye grass and grazed for the last three years. Following this crop of peas it was the intention of Mr. Tucker to sow wheat. The visitors then crossed the road to the property known as "Kentish's farm," where in an old cultivated paddock that had been spelled for several years was to be seen a splendid flock of extra large framed first crossbred ewes and lambs in tip-top condition and carrying fleeces that made them look like legless animals. This paddock was carrying two sheep to the acre with 95 per cent. of lambs at foot. The lambs were especially fine and were greatly admired; they were by Lincoln rams, and the whole flock had been in that paddock since July. Most of those present agreed that the whole flock looked remarkably well. The ewes were expected to average 10lbs. or 12lbs. of wool per head. The explanation of how Mr. Tucker managed to keep such numbers of sheep in paddocks between crops was that most of the division fences on this farm were wire-netted. The last field to be inspected was a paddock of potatoes; they were not yet above ground. The soil was free and black and well worked. Mr. Tucker used two manures here— $\frac{1}{2}$ cwt. super. B, and $\frac{1}{2}$ cwt. special potato manure per acre. The visitors then inspected the flower garden, and a bright and pretty sight it was; neat and tidy, with a fine show of colors. There were many very choice flowers—carnations, phlox, and roses. There were over 100 different varieties of these, a large number being standards, of which most were blooming. Members were entertained to tea by the joint hosts and the hostess, who were suitably thanked.

Keith, November 19.

PRESENT.—Messrs. Lock (chair), Tymer, J. and C. B. Godlee, Crouch, Schultz, Leishmann, and Dall (Hon. Sec.).

HORSE-BREEDING.—Mr. Crouch read a paper on this subject to the following effect:—"Every farmer should breed a few horses. There was great need, however, to improve the stamp of animal produced on the average farm. Only the best stallion available should be employed, and carefully selected mares. Good stock would always sell readily, while the market was generally glutted with weeds. Foreign buyers had secured many valuable animals from Australia in recent years, and the prospective oversea demand warranted breeders in producing larger numbers of horses of suitable type. In many cases faulty or unsuitable mares were used for breeding. A good way to select mares for this purpose was to set apart the fillies from some fairly satisfactory mares, and feed and keep them well. At three years old breed from these, and experience would soon prove which of them was most suited to become a permanent brood mare. Each one would have gained in frame and substance, as her year of ease would have much more than compensated for the healthy demand made upon her constitution by bearing and rearing a foal. The foal that had been taught to eat crushed oats and chaff before it was weaned would readily feed when taken from the dam. The cost of the corn supplied at this time would be repaid over and over again. Large numbers of foals were of low value in consequence of being allowed to lose flesh when weaned. He would recommend sowing a small paddock with lucerne or some other fodder, so that when the foals had to be turned out they would have good feed and would not fall away in condition. In consequence of the high values ruling for good horses, careful breeding should be a very profitable business."

Kingston, November 26.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. Jackson (chair), Wight, Coem, Clark, Goode, F. W. and C. F. Barnett (Hon. Sec.), and two visitors.

VISIT TO KYBYBOLITE EXPERIMENT FARM.—Five members visited this farm on November 25th, and a report was given at this meeting by Mr. Wight. Some of the crops had been utterly ruined by the wet season, while all showed the effect of too much water. The Mole drain plough, he considered, should be of considerable value in draining clay soils. In his opinion the department had a stiff problem if it was desired to make this farm pay its way. Mr. Jackson considered the country was not fit for closer settlement, but was only pastoral land. Mr. Wight thought local men should be called in to inspect land before it was repurchased, as in his opinion they would be in the best position to know if it was fit for farming.

Kybybolite, November 16.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), G. H. and C. Hahn, Smith, Kuhne, Farrow, Scott (Hon. Sec.), and two visitors.

SEEDING PRACTICES.—Discussion took place regarding seeding in this district. Mr. Bradley thought it best to sow at the end of July or the beginning of August. In June the soil was too wet and cold. It was very important to turn the weeds under, or kill them in some other way, before seeding. The later the crop was put in the shallower it should be, so that the sun's warmth would influence it quickly and keep it growing. Mr. G. H. Hahn believed in early sowing, but would wait until after the first rain, so as to kill the weeds. He considered the germination of a crop depended largely upon the rain which fell immediately after sowing. The soil might be in good tilth, but a surfeit of rain would drown half the seed. On the other hand a crop put into wet ground favored immediately with fine weather, would come on well. The best crop he had this year was sown early and fed down with sheep. To do this, however, it was necessary to have small paddocks, and frequently when the crop was ready for feeding off the soil was too boggy to carry the sheep. The Hon. Secretary thought early sown crops were best. They got a good start and withstood the wet and cold well.

WHEAT DISEASE.—It was reported that in some of the crops in this district plants turned yellow and died off. Some of the crops would hardly be worth reaping. Odd plants here and there stood out still healthy and vigorous among the diseased crops. [In cases of this kind it is always advisable to send a few of the affected plants to the department. Frequently the cause of the complaint can be discovered and sometimes preventive measures can be suggested.—Ed.]

VISIT TO EXPERIMENTAL FARM.—The Hon. Secretary reported on the visit paid on November 25th to the above farm. Considerable interest was displayed by the visitors, about 50 in number. The New Zealand turnip drill commanded special attention.

Kybybolite, December 15.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), G. H. and C. Hahn, Koth, Duffield, Smith, Farrow, Pettit, Scott (Hon. Sec.), and five visitors.

FARM ECONOMIES.—The following paper was read by Mr. G. H. Hahn:—"In this part of the country a farmer should be able to grow his own wheat for flour, his mutton, bacon, beef, butter, and eggs. After a little while he should produce on the farm both fresh and dried fruit. Vegetables, such as cabbage, cauliflower, turnips, radish, carrots, parsnips, beans, peas, &c., onions, and potatoes can with a little trouble be grown for home use if not for sale. All this would help to keep down living expenses, while any surplus would find a ready market. Every farmer should have a good waterproof shed for his implements. Repairs needed to implements should be recorded when noted and parts ordered or repaired; if left till later they may be forgotten, and then when the implement is wanted there will be delay. Haystacks should be properly built and thatched as soon as possible. I find a good coat of loose straw properly laid on will shed the water very well and save perhaps several tons of good hay. It is very wasteful in this part of the State to leave a haystack in winter without some covering. Horses are very valuable, and all workers should have a good waterproof and windproof stable. The animals should be watered and fed at regular times. I think it pays to give all horses a little feed when not working unless there is plenty of grass, and in this part of the country that is the case only for a short time in the spring." Members agreed with the paper, but found it rather hard in a new district to keep up to all these things. It was suggested that for roofing a stack straw should be kept from the previous year so that the stack could be covered as soon as it was built.

Mount Gambier, December 10.

(Average annual rainfall, 31½in.)

PRESENT.—Messrs. Sassanowsky (chair), Ruwoldt, Sutton, Wedd, Keegan, Wheeler, Engelbrecht, Holloway, Schlegel, Kennedy, Niguét, Pritchard, Pick, Buck, and Collins (Hon. Sec.).

VISIT TO "LOWAN" AND "KOORINE."—The secretary gave a short report on the visit of the branch members to "Lowan" and "Koorine." Only 12 members went, a fact which was, no doubt, due to the fine weather, members staying home for shearing and haymaking. It was an enjoyable outing. Referring to the Romney Marsh and Romney cross sheep, he said it was regarded as a strong recommendation for the Romney

Marsh sheep that they were proof against footrot; but that was a mistake, for at one of the places visited not only were some of the rams limping, but the crossbreds were also bad. Mr. Riddooh took the members for a very enjoyable drive through "Koorine" and the farms. The Chairman said the last paddock they looked through at "Koorine" was a beautiful one. Mr. Riddooh told him that when they went there first it would carry only 1,200 sheep, and that badly, but that now it carried 2,400; the improvement was due to drainage.

"*TRIFOLIUM SUBTERRANEUM*."—Mr. Buck exhibited two plants of *Trifolium subterraneum* grown on his land on the Bay Road. They were 5ft. to 5½ft. long. He had a paddock of 40 acres of it, and 31 head of cattle always in it. He said it grew long and trailed along the ground, but did not seem to strike anywhere. It was not good for hay, being too moist. It was growing amongst Birdseye clover.

VISIT TO KYBYBOLITE GOVERNMENT FARM.—The Chairman gave a short account of the visit of Bureau members to Kybybolite. Five went from Mount Gambier. The season had been rather too wet for it, and some of the wheat had been completely ruined. The great want of the farm was drainage. It was hoped that the mole-drain plough recently imported from New Zealand would help to overcome this difficulty. The orchard was growing well; and then in the poultry station they saw a large number of fowls. The hay crops were doing well. The sheep looked in the pink of condition. In years when there would not be so much rain he thought the farm would go ahead.

CLYDESDALE HORSES.—Mr. W. J. Sutton read a paper on "Clydesdale Horses and the Veterinary Examination of Stallions." The Clydesdale horse was spoken of as the finest in the world. The writer advised the use of only the best stallions, free from hereditary disease. He commented upon the giving of small prizes for Clydesdale stallions—animals that had cost hundreds of pounds—and very large prizes for hunters and horses of that description at the agricultural societies' shows, and thought a more rational prize list would encourage the production of first class Clydesdales. Referring to the veterinary examination of stallions, he said veterinary surgeons differed, and often horses that were condemned by them produced the very best stock. The Chairman said at Mount Gambier very fair prizes were given for draught stallions, but there was an important difference between them and hunters. Stallions were supposed to produce money outside all the season; hunters only produced money in the show ring. He did not think the giving of big prizes for draught stallions would help them in any way in bringing the best horses into the district. The great desideratum was to get rid of the condemned stallions, and that was hard to do. He thought the standard should be high enough to have only the best horses at the shows. The practice of examining stallions and certificating them was a good thing. Mr. Wheeler thought farmers should try to breed only good stock. Cheap and inferior entires were filling the country with inferior horses. If the mongrels were done away with the quality would be raised. He believed in veterinary examinations. Mr. Buck also believed in breeding only from sound horses; and Mr. Sutton agreed that the inferior horses should be done away with, and it would give the owners of good stock a chance. Mr. Wedd believed that the veterinary examination of horses would work right in time, and improve the breed of horses. It would work out the mongrels and weeds. He thought Government inspection was a good thing, although it was hard on some people at the start. Mr. Keogan said certificates for life were only granted to horses at least five years old that were found sound. If they were to stick to certificated horses only they would not have enough to do the work of the district.

Penola, December 3.

(Average annual rainfall, 26½in.)

PRESENT.—Messrs. Peake (chair), Wilson, McDonald, Miller, Strong, Darwent, Richardson, and Adamson (Hon. Sec.).

VISIT TO KYBYBOLITE EXPERIMENTAL FARM.—Mr. Darwent and the Hon. Secretary gave an account of their recent visit to the Kybybolite Experimental Farm. Much of the wheat was a failure owing to the wet season, but the hay and oat crops looked very promising. The numerous root crops and maize were not very far advanced, having not long been sown, but the results would be awaited with much interest. Mr. Darwent considered that the turnip crop should have been sown at intervals, so that the correct time for planting could be ascertained; but Mr. Strong thought that even then it would be a difficult matter to fix, as owing to the varying nature of the seasons in the South-East no particular time of sowing could be fixed.

CLOVER.—The Hon. Secretary tabled a sample of Schanck clover which was rapidly becoming established in the district. Members considered it an ideal fodder, and said stock were exceedingly fond of it.

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Inter-State Conference on Dry Farming.

The Minister of Agriculture (Hon. J. P. Wilson) has issued invitations to representative farmers and officials of the Departments of Agriculture of the other States to attend a conference on dry farming to be held in Adelaide on March 6th, and from the replies which have been received it is evident that the conference will be thoroughly representative of Australia. The Minister of Agriculture will deliver an opening address, and Professor Lowrie, the newly appointed Director of Agriculture, will preside. Addresses will be given by officers of the Agricultural Departments of the several States, and amongst the papers to be read will be some by the Hon. T. Pascoe, M.L.C., Mr. C. E. Birks, of Wandearah, and by Mr. A. J. A. Koch, of Lamerloo. The importance of the conference will no doubt be recognised throughout Australia. The field for the extension of the cultivation of our cereal crops is the drier areas beyond Goyder's rainfall line, and it will be of the greatest value to all the States to be able to compare the experiences of scientific men and practical farmers in the matter of conserving moisture by dry farming methods and growing crops with a light rainfall, and their opinions of American results under Campbell's system. A very complete report on American methods of dry farming by Mr. W. Strawbridge, C.M.G., Surveyor-General, was published in the *Journal* in 1908. It is probable that Senator McColl, of New South Wales, who visited America and presented a report on dry farming to the Commonwealth Government last year, will attend the conference.

Return of Professor Perkins.

The Principal of the Roseworthy Agricultural College, who left the State on January 20th, 1910, returned on the 21st of last month. This 12 months' absence represented partly long leave, and partly time taken up in the investigation of the agricultural conditions of countries visited. Professor Perkins was in Egypt from the 14th of February to the 19th of March. From thence he proceeded to Greece, where he remained until April 14th. Six days were subsequently spent in Smyrna and its environs, and on April 23rd he left that port for Constantinople. A stay of 10 days was made here, during the course of which various points of interest in Anatolia were visited. Constantinople was left on May 5th, and after a short sojourn at Marseilles,

London was reached on May 21st, *via* Gibraltar. The Professor continued in Great Britain until September the 6th. During his stay there he attended the Royal Agricultural Society's Show at Liverpool and the Highland Society's Show at Dumfries. He also visited the Rothamsted Agricultural Experiment Station, the Cirencester Royal Agricultural College, His Majesty's Sandringham Estate, the Royal Farms at Windsor, Lord Rothschild's Tring Estate, the Newton Rigg Farm School, the Royal Agricultural Society's Experiment Station at Woburn, Oxford and Cambridge, the English Lake District, and various portions of Scotland, Ireland, and Wales. From England Professor Perkins proceeded to France, visiting successively Paris and its environs, Avignon, Montpellier, Cette, Carcassone, Bordeaux, and Bayonne. Whilst in France he had occasion to visit the State Merino Stud Farm at Rambouillet, the various agricultural colleges and State institutions, and the great vine districts of the south and south-west. From October the 14th to November 3rd was spent in Spain. Particular attention was paid to Andalusia and the southern districts. After a few days' unavoidable detention at Marseilles, the Professor left for Tunis on November 10th, where he stayed until November 27th. Here he had occasion to visit the Colonial Agricultural School, the Pasteur Institute, and various farms and vineyards of interest. From December the 1st to 20th was spent in Italy and the Riviera, and on the return Marseilles was left for the homeward journey on December 23rd. Professor Perkins has already forwarded to the Minister of Agriculture four reports dealing with matters of interest that came under his notice. The first report, dealing with Egypt, was forwarded on March the 18th; the second, dealing with Greece, on May 13th, the third, dealing with Asia Minor and the Royal Agricultural Show at Liverpool, on August the 3rd; and finally the fourth, dealing with others matter of interest noted in Great Britain, on November the 14th. Further reports on questions of interest will be furnished from time to time. A cablegram asking Professor Perkins to make inquiries into the olive-growing industry in the south of Europe reached him too late to permit of special attention being paid to this question. Nevertheless, he was able to pick up a few points of interest on the subject in Spain and the north of Africa.

Parafield Seed Wheat.

Owing to the exceptional demand for graded seed wheat from the Parafield Experimental Farm this season, every bushel available for distribution has already been applied for many times over. As a result many applications for seed will have to be rejected; but, in order that unsuccessful applicants may not be again disappointed, many orders are now being booked ahead

for next season's delivery. The following varieties of wheat will be sown for next season :—Bayah, Genoa, Thew, Bunyip, Firbank, Special Federation, Special Comeback, White Tuscan, Dart's Imperial, Huguenot, Medeah, Correll's No. 7, Bobs, Kubanka, Yandilla King, King's Early, Gluyas, American No. 8, Cumberland, Marshall's No. 3. The price will be guided by the market rates, but will probably vary from 5s. to 6s. per bushel for graded seed, according to the variety.

Egg Circles.

The substance of the report of the Select Committees of both Houses of Parliament which made an exhaustive inquiry into the results of the egg circles system was contained in paragraphs 4 and 5, which were as follows :—
“ We find that the venture has up to the end of October, 1910, resulted in a loss to the Government of £8,643 12s. 4d. from capital, in addition to a loss of profits not yet ascertained. The causes contributing to this loss are—
(a) Eggs going bad through excessive handling for grading purposes while in cold store, (b) pulping eggs bought at too high a price, and pulp going bad in the freezer; (c) the business growing so rapidly as to get beyond the capacity of the management, and insufficient suitable accommodation; (d) the employment of some inefficient sorters and packers; (e) the want of a competent business manager with the necessary commercial training and experience; (f) the custom adopted of not charging the consignor with cracks and smashes caused during transit to the depot, and the paying in certain instances of prices at country stations above the market rates; (g) the reckless buying on the part of the management from others than members of the egg circles at a time when there was no possible hope of a profit.”
The Committees recommended—“ 1. That the operations by the Government as purchasers in such a risky business be stopped forthwith. 2. That until a Board be appointed on co-operative lines to be responsible for the management and losses, the Department deal with egg circle eggs on commission only.” Acting on the first recommendation the Government ceased to purchase eggs from producers from January 31st, but eggs will be received by the Produce Export Department from producers and markets found for them either in Australia or abroad on a commission basis. The evidence given before the Committees showed clearly that the quality of circle eggs created a special demand for them at an enhanced price. It remains for the producers to say whether the better prices that their eggs commanded remunerated them for the little extra trouble they had to go to in marketing them in first-class condition. If so, the egg circles system will probably be carried on to the mutual advantage of the producer and the consumer, and the amount which the Government have lost in initiating the system will not have been spent in vain.

Wheat Elevator at the Outer Harbor.

The Wheat Commission in its two reports made 25 recommendations, and the last one, namely, "That a small elevator equipment be provided at the Outer Harbor to facilitate the conduct of experimental shipments in bulk handling by the Government and by private exporters," is likely to be the first to be acted upon. The House of Assembly last year approved of the idea by voting £1,000 for an experimental shipment of wheat in bulk, and the Minister of Agriculture is now giving his attention to the question of the best scheme to adopt in the expenditure of this money. He has had the advice of representatives of Sydney firms, and with them he has inspected a proposed site at the Outer Harbor, where it is estimated a substantial elevator and silos can be erected for from £7,500 to £10,000. The Wheat Commission collected a considerable amount of evidence respecting shipment of wheat in bulk, but in view of the conflicting nature of it no definite decision as to whether bulk shipment would be advantageous to the producers was arrived at. If trial shipments showed that a better price could be obtained for graded wheat, and that the increased return would more than pay for the cost of grading, one of the lions in the path would be removed.

Turretfield Dairy Farm.

The area of the Turretfield Dairy Farm is 1,600 acres, and the Minister of Agriculture considers that this is too large for the purpose for which the farm was established. He therefore proposes to hand over about 1,000 acres to the Crown Lands Department for afforestation purposes. He has suggested that there might be a belt of timber surrounding the farm as well as a central plantation. There is ample scope in South Australia for teaching farmers the advantages of providing shade and shelter for their stock.

S.A. Beekeepers' Association.

With the impetus given the apicultural industry of the State through the establishment of the London market as an outlet for the surplus of South Australian honey, and the registration of the South Australia Beekeepers' Co-operative Union, Limited, for the protection of the commercial interests of the honey producers of the State and the maintenance of a continuity of supply of honey to the already established markets in England and on the Continent, the resuscitation of the South Australian Beekeepers' Association followed as a natural corollary. The objects of this body include all matters of interest to apiarists. With the advancement of the rural industries of the State the necessity for the protection of the natural sources of honey

supply is being more and more impressed on those engaged in beekeeping, and it is fully recognised that it is only by strong organisation and united effort that the rights of the apiarist can be made to receive their due respect. The officers of the association are—President, Mr. T. H. Smeaton, M.P.; vice-presidents, Messrs. A. W. S. Wild, R. McDonald, and C. G. Gurr; committee, the vice-presidents and Messrs. W. Drage, W. Colyer, L. Darby, W. G. Smith, F. A. Baker, H. R. Meyer, J. Norton, J. Robertson, F. Hooper; secretary and treasurer, Mr. H. J. Finnis.

West Australian Wheat Standard.

The weight of the standard bushel in Western Australia has been fixed for the present season at 62½lbs., the same as in South Australia. Last year the weight was 62lbs.—½lb. less than in this State.

Imports and Exports of Fruits.

During the month of December 4,656bush. of fresh fruits, 105pkgs. of vegetables, 6,655 bags of potatoes, 87 bags of onions, and 46pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act; 76bush. of bananas (chiefly over-ripe) were destroyed. At Serviceton 106bush. of fresh fruits were admitted. The exports to inter-State markets examined and passed at Adelaide and Port Adelaide comprised 8,672bush. of fresh fruits, 1,618pkgs. of vegetables, 22 bags of onions, and 3pkgs. of plants. In addition 186bush. of fresh fruits were certified for export at Renmark, 75bush. at Gawler, 32bush. at Laura, 35bush. at Clare, 105bush. at Salisbury, 118bush. at Stirling North, and 5pkgs. of plants at Stirling West. Under the Federal Commerce Act, 520 cases of fresh fruits, 174pkgs. dried fruits, 33pkgs. preserved fruit, and 50pkgs. honey were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand—500 cases citrus fruit, 20 cases cherries, and 174 cases dried fruit; for Germany—50 cases honey, and 2pkgs. jam; for India—31pkgs. preserved fruit. Under the Federal Quarantine Act 3,828pkgs. plants, seeds, bulbs, &c., were admitted from oversea sources. During the month of January 5,177bush. of fresh fruits, 1,439 bags of potatoes, 59 bags of onions, and 38pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine,

Fruit, and Vegetable Protection Act. Twenty bushels of bananas, 31bush. of apples, and 7bush. of plums were rejected and destroyed. The exports to inter-State markets examined and passed at these places consisted of 12,634bush. of fresh fruits and 3,367pkgs. of vegetables. In addition 170bush. of fresh fruits were inspected and passed at Renmark, 69bush. at Gawler, 5bush. at Coonawarra, 148bush. at Wirrabara, and 141bush. at Stirling North. Under the Commerce Act 2,235pkgs. of dried fruit, 40pkgs. of preserved fruit, and 1pkg. of plants were exported to inter-State markets. These were distributed as follows :—For London, 2,135pkgs. of dried fruit ; for New Zealand, 100pkgs. of dried fruit and 1pkg. plants ; for India, 40pkgs. preserved fruit. Under the Federal Quarantine Act 1,217pkgs. of plants, seeds, bulbs, &c., were admitted from oversea sources.

Agriculture in Japan.

The Director of the Agricultural Bureau of Japan has forwarded to the Department of Agriculture a work of 132 pages, entitled " Outlines of Agriculture in Japan." The book is in English, and is published by the Agricultural Bureau of the Department of Agriculture and Commerce, Tokyo, with the object of enabling foreigners to understand the present conditions of agriculture in Japan. The mere fact of such a work being published in a foreign language is proof of the progressiveness of the Japanese Department of Agriculture, and if similar proof of the advanced state of agriculture in South Australia were required in the Japanese language it would be furnished with difficulty. The book is so full of information that it must accomplish the object with which it was issued. It is shown that of a total population of 51,000,000, 31,000,000, or 60 per cent., are engaged in or dependent upon agriculture. The farms of course are small. Anyone who possesses more than 75 acres of land is regarded as a large landed proprietor, since an ordinary landowner's estate does not exceed 25 acres. Tenants' rents are by no means low, the rent ranging from 44 per cent. to 57 per cent. of the gross value of the products of the farm. Were it not for the fact that crops are raised twice, thrice, and even four times a year the tenants could not exist. Their " farms " vary in size from 1.96 acres to 3.68 acres, on which they support a household consisting sometimes of six members. To some extent they have to rely on subsidiary occupations such as making mats, baskets, paper, and bamboo articles, such work being done at night. Seventy per cent. of the farmers cultivate less than $2\frac{1}{2}$ acres, and only 3 per cent. cultivate more than $7\frac{1}{2}$ acres. Rice, of course, is the principal crop, and its annual value is equal to that of all other products, including the following, which

are given in their order of importance :—Barley and wheat, raw silk, vegetables and fruits, beans, sweet potatoes and potatoes, and animal products. An interesting chapter on "Agricultural Administration" shows that the Government are alive to the advantages of educating and assisting the farmers. Co-operation amongst farmers is encouraged, and financial assistance is given in the working of the farms and in disposing of produce. Stringent measures are taken for the prevention of disease in animals and for the destruction of insect and fungoid pests, an army of inspectors being appointed to see that effect is given to legislation. It is pointed out that the future of agriculture is highly promising, and that at an early date the import of cereals will not be necessary.



MILLING EXPERIMENTS.

III

(Continued from page 568.)

By A. E. V. RICHARDSON, M.A., B.Sc. (Agric.), Acting Director
of Agriculture, and G. H. STEVENS, Departmental Miller.

ABSORPTION OF MOISTURE IN CONDITIONING.

In the last article reference was made to the important question of conditioning wheat, and an attempt was made to show the practical importance of the process.

A great deal of misconception exists as to what becomes of the moisture absorbed during the conditioning process. Some practical millers affirm that the whole of the moisture absorbed by the grain is lost during the process of grinding. Certainly not the whole amount of moisture absorbed during the conditioning process is retained by the mill products, for we would naturally expect a considerable amount to evaporate owing to the heat developed by the process of rolling and the exposure of the mill products to air currents during the work of purification.

Many practical millers, again, affirm that the moisture seriously interferes with the strength of the resultant flour, and that it also interferes with the keeping quality of the flour.

How this opinion became current is difficult to say. Such an opinion tacitly implies that in conditioning the moisture is allowed to penetrate the endosperm of the kernel; but when properly carried out the process of conditioning is never carried so far as to induce sweating of the grain or fermentation. The ideal is to arrest the conditioning process just before the moisture begins to penetrate the aleurone layer, and if this be done it is difficult to see how the strength could possibly be interfered with, and it is equally difficult to imagine that such conditioning could in any way interfere with the keeping quality of the flour.

However, in order to gain some precise information on the distribution of moisture in the mill products, samples of bran, flour, and pollard from

Marshall's No. 3, Comeback, Dart's Imperial, and Bunyip, conditioned and unconditioned, were tested for moisture with the following results :—

TABLE I.—MOISTURE IN MILLING PRODUCTS.

Variety and Treatment.	Percentages of			Total Moisture in Wheat.	Moisture in			Moisture absorbed in Conditioning
	Flour.	Bran.	Pollard.		Flour.	Bran.	Pollard.	
Marshall's—				%	%	%	%	%
No. 3 (conditioned) ..	71.1	14.9	14.0	15.61	13.73	16.66	12.94	2.48
No. 3 (unconditioned)	71.0	15.4	13.6	13.93	14.07	14.38	13.24	—
Comeback—								
Conditioned	71.0	13.3	15.7	15.71	13.03	15.06	11.58	2.57
Unconditioned	71.0	13.7	15.3	13.4	13.31	13.76	12.46	—
Bunyip—								
Conditioned	68.3	14.7	17.0	16.03	13.97	17.03	14.66	3.71
Unconditioned	68.3	14.2	17.5	13.63	13.28	13.69	12.72	—
Dart's Imperial—								
Conditioned	70.8	17.7	11.5	17.52	13.55	17.99	12.72	3.91
Unconditioned	70.9	16.5	12.6	15.36	13.45	14.87	13.32	—

An examination of the table will reveal the fact that—(1) In conditioning the total moisture in the wheat berry increases in Marshall's No. 3, 1.68 per cent. ; Comeback, 2.31 per cent. ; Dart's Imperial, 2.06 per cent. ; Bunyip 2.40 per cent. (2) That in general the flour and pollard from conditioned wheat contains slightly less moisture than that of the unconditioned flour and pollard. This is rather curious, and it certainly directly disproves the claims of those who maintain that conditioning is responsible for an increase of moisture in the flour, a lowering of strength, and that it seriously interferes with the keeping quality of the flour.

The case of Bunyip is interesting, because here conditioning was allowed to proceed further than was customary, and it will be noted that the flour and pollard contained a higher percentage of moisture than the unconditioned samples, and, as will be noted from the previous article, that in the case of Bunyip the strength of the flour was lowered by the process of conditioning.

From a survey of the figures it will be apparent that, with reasonable care, conditioning may be carried out so that practically all the moisture absorbed by the grain will be contained in the external shell, and not interfere in any way with the flour.

BREAK FLOUR.

Break flour is the flour obtained during the breaking down of the wheat berry, previous to the elimination of the bran. Ever since the advent of the roller mill break flour has given both the miller and the milling engineer considerable trouble. Much diversity of opinion exists regarding the true function of break flour in the process of gradual reduction. The only questions of interest to us are—how does it differ from the rest of the flour produced

by the reduction rolls in the matter of strength, gluten, nitrogen content, and color.

We have carefully prepared break flour from many different varieties of wheat, and find that it differs very materially from the rest of the flour, which might be termed "reduction" or "bulk" flour.

The following table summarises the results:—

TABLE II.—BREAK AND REDUCTION FLOUR.

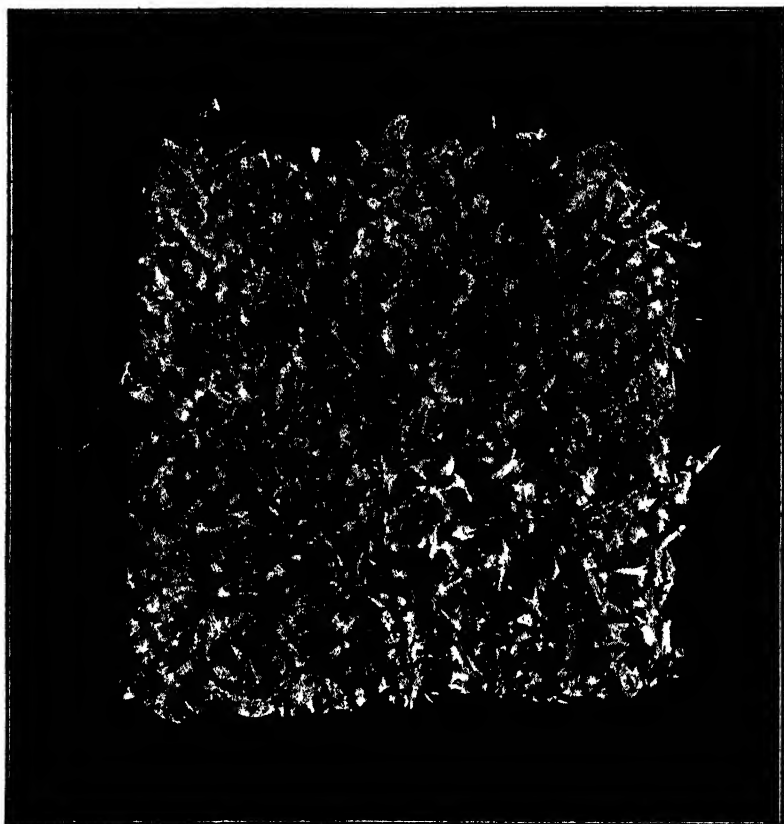
Variety.	Color.	Total N.	Dry Gluten	Wet Gluten.	Factor N.	Strength.
1. Federation (conditioned)—						
Break flour	Excellent	1.169	6.5	17.85	5.56	41.0
Reduction flour.....	Very fair	1.288	6.7	19.6	5.19	47.2
2. Federation (unconditioned)—						
Break flour	Very good	1.232	6.5	18.5	5.28	41.0
Reduction flour.....	Good	1.302	6.4	18.7	4.92	47.4
3. Dart's (conditioned)—						
Break flour	Excellent	1.218	6.2	19.6	5.08	42.0
Reduction flour.....	Very good	1.260	6.1	19.5	4.92	45.0
4. Dart's (unconditioned)—						
Break flour.....	Excellent	1.148	6.3	19.5	5.48	42.0
Reduction flour.....	Good	1.225	6.0	17.5	4.90	45.8
5. Comeback (conditioned)—						
Break flour	Good	1.631	9.75	30.3	5.98	50.0
Reduction flour.....	Fair	1.687	8.45	23.25	5.00	56.6
6. Comeback (unconditioned)—						
Break flour	Fair	1.736	10.00	26.9	5.75	50.5
Reduction flour.....	Fair	1.736	8.85	24.55	5.09	56.6
7. Bobs (conditioned)—						
Break flour	Bad	2.555	14.0	40.6	5.48	50.2
Reduction flour.....	Very bad	2.212	11.8	32.7	5.31	60.0

As far as the color goes, break flour is sometimes regarded as inferior in color to reduction flour. It is commonly held that, however carefully the wheat may be cleaned by mechanical processes, there is still sufficient dust and dirt left on the berry to cause discoloration in any flour that may be allowed to come into contact with it. From this it might be inferred that all flour produced prior to the elimination of the skin or bran must be dirtier than flour prepared from pure semolina or middlings. There is, further, a certain amount of discoloration associated with the fourth break, due partly to the nearness of the rolls and the pressure caused by the feed. The tendency of some of the bran under these circumstances is to cut up very fine and dress through with the flour, thus inducing speckiness.

In spite of all this, it has been our experience that, providing a reasonable amount of break flour is produced, and that the breaking process is conducted in a gentle manner with a view to narrowing down the amount of break flour produced, the break flour is invariably superior in color to the bulk flour.

The superiority of color, however, is not associated with a corresponding superiority in strength. As a matter of fact, the break flours have, without exception, given lower strength than the bulk flours.

It is well to point out that the break flour is, with the exception of that produced from the fourth break, invariably much whiter and clearer than that of the reduction flour. Coming as it does from the central portions of the kernel, this might well be expected. It must not be understood that the



BEESWINGS FROM CONDITIONED WHEAT.

reduction flour is of poor quality in respect to color. Generally speaking, the broad distinction between the two types of flour is that the break flour tends towards starchy whiteness, while the reduction flour tends to be darker in color, though frequently it has a good golden cast.

Dealing with the nitrogen and gluten content, a rather interesting point arises. It would appear that in the flours examined, with the single exception of Bobs, the nitrogen content of the reduction flour is rather more than

that of the break flour. The gluten content, however, is on the whole rather more in the break flour than in the bulk flour. As a result the factor N is greater in all cases in the break than the bulk flours.

In connection with the strength the break flour is undoubtedly weaker than the reduction flour.

BLENDING EXPERIMENTS.

Very rarely, if ever, do millers in practice mill one variety by itself. In England, where wheat pours in from every wheat-exporting country of the globe, blending has become quite an art, and there is no branch of practical milling which possesses greater interest and fascination than that of blending. The English miller has a wide range of wheats to select from, and consequently greater judgment is necessary on his part to produce a flour of the best quality from his raw material. The great aim, indeed, the keystone of success in milling, is to produce a high-class flour of *unvarying* quality.

In this respect the English miller is at a great advantage compared with his foreign competitors, who have fairly uniform wheat to operate on. The English miller may use the soft wheats of low flour strength, characteristic generally of the English wheats, or the hard, red, strong wheats of Minnesota or Manitoba and spring American generally; the dry, ricey flinty varieties of medium strength, characteristic of India; the hard, red, strong varieties of Russia; or the harsh, white varieties of medium strength characteristic of Australia. Endless variations of each of these general types are to be found on the market, and the home miller needs to be well posted in the intricacies of mixing and blending to achieve permanent success.

With Australian mills the problem is not so complicated, for the wheats at their disposal are fairly uniform in character. The spring American, Russian reds, dry Indians, and Canadian hard reds are strangers to the Australian milling trade.

The blending carried out in mills generally consists in blending varieties of wheat prior to their entry to the break rolls. This is the universal practice in blending. Grinding each variety separately in bulk and blending the resultant flours is a system of blending which, as far as can be ascertained, is rarely practised. It must be patent to everyone that there are wide differences in quality in different varieties of wheat. Very rarely indeed will it be found that two varieties of wheat condition alike.

Consequently in a complex wheat mixture where hard, flinty, and soft wheats are mixed together, uniform conditioning is practically impossible. The work of conditioning is of considerable importance in practical milling, and if conditioning is to be carried out on a wheat mixture of very diverse character it must be apparent that the hard and soft wheats will not behave alike.

The conditioning of the grain and the setting of the mill necessary for the most expeditious handling of a hard, flinty wheat is not likely to be the

best line of treatment for a soft, starchy wheat. The conditioning and grinding of each wheat on its merits, however, and the subsequent blending of the flour would obviate the above difficulties. Whether there is any material difference in the results of these methods of blending can best be found out by experiment.

To simplify the matter, simple mixtures of a strong wheat (Comeback) with a weak wheat (Dart's Imperial) and with a medium strong wheat (Federation) were used, and each of these varieties were then ground separately, and the resultant flours combined in various simple ratios.

Table III. summarises the results.

TABLE III—BLENDING WHEAT AND FLOUR.

I. WHEAT.

	Strength.	Nitrogen.	Dry Gluten.	Color.
Comeback	51.5	1.87	9.72	Very fair
Federation	46.0	1.40	6.57	Very good
1. Federation .....1 }	50.25	1.62	8.2	Good
Comeback .....1 }	[50.0]	[1.63]	[8.14]	
2. Federation .....1 }	51.0	1.83	9.1	Very fair
Comeback .....3 }	[52.2]	[1.75]	[8.93]	
3. Federation .....3 }	49.0	1.49	7.3	Very good
Comeback .....1 }	[48.1]	[1.52]	[7.35]	
Comeback	54.5	1.87	9.72	Very fair
Dart's Imperial	44.0	1.372	6.30	Excellent
2. Dart's Imperial ...1 }	53.0	1.806	9.1	Good
Comeback .....3 }	[51.75]	[1.75]	[9.11]	
3. Dart's Imperial ...3 }	47.0	1.61	7.4	Very good
Comeback .....1 }	[46.6]	[1.49]	[7.2]	

II. FLOUR.

	Strength.	Nitrogen.	Dry Gluten.	Color.
1. Federation .....1 }	53.6	1.68	8.3	Good
Comeback .....1 }	[50.25]	[1.63]	[8.14]	
2. Federation .....1 }	54.2	1.82	9.1	Good
Comeback .....3 }	[52.2]	[1.75]	[8.93]	
3. Federation .....3 }	52.2	1.51	7.45	Very good
Comeback .....1 }	[48.1]	[1.52]	[7.35]	
1. Dart's Imperial ...1 }	52.0	1.71	8.2	Very good
Comeback .....1 }	[49.75]	[1.62]	[8.0]	
2. Dart's Imperial ...1 }	54.8	1.81	8.8	Good
Comeback .....3 }	[51.75]	[1.75]	[9.11]	
3. Dart's Imperial ...3 }	51.4	1.57	7.4	Very good
Comeback .....1 }	[46.6]	[1.49]	[7.2]	

In the above table the figures within the brackets indicate what we might assume to be the strength, nitrogen and gluten content of each combination from purely theoretical considerations, on the assumption that each is a mechanical mixture, and that the mixture is made up of fixed proportions. So far as the nitrogen and gluten contents are concerned it will be noted that the calculated figures, or the results, &c., that we should expect from the known composition of the mixture, are practically identical with the figures obtained on analysis of the flours; but when we examine the flours for strength it will be noted that without exception the actual strength is considerably above the calculated strength.

Again, it will be noted that the strength of the mixtures obtained from the blending of the flours is considerably above the strength of the corresponding mixtures obtained in blending wheats.

It would appear from a perusal of the figures that we can calculate with considerable accuracy the probable nitrogen and gluten content of any mixtures of either wheat or flour provided we know the nitrogen and gluten content of the component parts of the mixture.

The probable strength of a given mixture, either of wheat or flour cannot, however, be determined by simple calculation, but the foregoing figures tend to prove that if a weak or medium strong wheat be mixed with a strong flour wheat considerable improvement in strength of the two former takes place, and the improvement, especially with blends of flour, is considerably in advance of what might be expected from a knowledge of the strength of the originals of the blend.



A STATION HOMESTEAD.

OIDIUM, OR POWDERY MILDEW, OF GRAPE VINES.

COMPARED WITH DOWNY MILDEW (*PLASMOPARA*).

By GEO. QUINN, Horticultural Instructor, &c.

The recent destructive outbreaks of this disease in some of the currant and sultana vineyards at Renmark Irrigation Settlement, as well as its prevalence to a lesser degree in several other vine-growing districts, has once more drawn attention to the fact that even this familiar fungus should not be held too lightly. Up till a dozen years ago preventive measures were used each spring against it, and "sulphuring" the vineyards was looked upon as being almost as essential an operation as pruning the vines. Whether it was the continued immunity from loss—the result of this treatment—engendered general contempt, or that comparative banishment of the fungus had been caused by the succession of hot, dry seasons, is open to argument. The fact, however, remains that old-established precautions were abandoned, and those who have entered the ranks of our vinegrowers during the last decade appear not to know what to expect from the depredations of this somewhat insidious foe; hence it is that I have deemed it desirable to hark back to the repetition of information which was common knowledge amongst our vinegrowers of a generation ago. From the impressions gathered when investigating the recent outbreak at Renmark much doubt existed amongst the growers there respecting the identity of the disease. On account of the devastation caused by the downy mildew in the currant vineyards in Greece, much alarm was felt lest this should prove identical with the Grecian scourge, as it had not at Renmark previously injured the currant vines, though sultanas and Gordos had been attacked. With a view to setting at rest any doubts on this particular point I have reproduced herein drawings taken from Massee's "Text Book of Plant Diseases," showing the structural differences which exist between these two fungi, and quote in brief the descriptions given by that writer.

A slight digression must be made here to explain that the fungus we know here as *Oidium Tuckeri* of Berkeley has been long accepted in North America and more recently in Europe as only the conidial, or asexual, stage of another fungus called *Uncinula spiralis*, Berk. and Cur.

Mr. D. McAlpine (Vegetable Pathologist to the Government of Victoria), who is accepted as the leading authority on fungi in Australia, informs me

that "the *Uncinula* has never been found in Australia." So that whilst we have the *Oidium* stage now there yet remains an interesting field for research to ascertain whether the chain of evidence can be completed here—as it was in Europe in 1892, or pretty well half a century after the introduction of the disease—which shall establish its identity with *Uncinula spiralis*.

The following is Massee's description, written in 1907, of powdery mildew :—
"The conidial stage of this fungus has been known in this country (Britain)

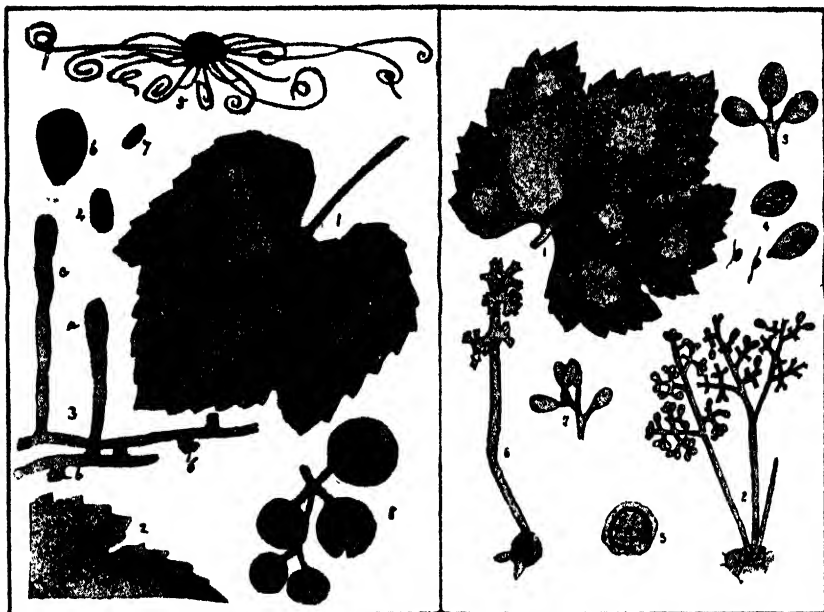


FIG. 1. *Uncinula spiralis*.—(1) Fungus forming white patches on the upper surface of a vine leaf. (2) Part of a vine leaf with the fungus bearing perithecia. (3) Portion of mycelium, bearing erect chains of conidia at *a a*, and haustoria, which send slender tubes into the living cells of the leaf *b b*, $\times 300$. (4) A single free conidium, $\times 300$. (5) A perithecium, with its curled appendages, $\times 100$. (6) An ascus containing six spores, $\times 300$. (7) A tree ascospore, $\times 300$. (8) Grapes attacked by the disease. (After Massee.)

FIG. 2. *Plasmopara viticola*.—(1) Under surface of a vine leaf, showing patches of mildew. (2) Group of conidiophores bearing conidia, $\times 80$. (3) Three conidia, $\times 300$. (4) Conidia forming zoospores; in *a* the zoospores are yet within the conidium; in *b* two zoospores have escaped from the conidium, $\times 300$. (5) Mature zoospore or resting-spore, $\times 300$. (6) An zoospore germinating and producing a conidiophore, highly mag. (after Prillieux). (7) Autumnal form of conidiophore bearing a few large conidia lightly mag. (After Massee.)

since 1845, when it was described by the Rev. M. J. Berkeley under the name of *Oidium Tuckeri*. It is probably a native of the United States [and Japan], where it is common on both wild and cultivated vines. The fungus forms *white or greyish-white patches on the upper surface of the leaves*, young shoots, and fruits. After the patches have been present for some time, numerous short branches of the mycelium (the masses of horizontal filaments constitute the mycelium) grow erect, each branch becoming converted at its upper part into a chain of oblong conidia. [This is seen in 3, Fig. 1.] The terminal

conidium is the oldest, and when mature falls off, the one below following suit. At the same time new conidia are being produced at the base of the chain. This formation of numerous chains of upright conidia gives to the patches a minutely powdery appearance; hence the popular name. Myriads of conidia are produced throughout the summer, and, being washed by rain on to the surface of the healthy portions of the vine where they germinate at once, the disease spreads." Here, in South Australia, the distribution is most probably caused by the conidia, or spores, falling or floating in the wind and lodging upon adjoining parts of the vine or vines which are damped by dew.

Thus far Massee's description tallies with our *Oidium Tuckeri*, as found at Renmark and elsewhere. He then proceeds to describe the link which connects the fungus in Europe and America with *Uncinula*: "Towards the end of summer a second and higher form of fruit develops on the patches of conidia bearing mycelium, first appearing as yellow points, which finally change to black. [See 25, Fig. 1.] These bodies are called perithecia, and are hollow spheres, containing in their interior spores produced in asci. [See 6, Fig. 1.] The perithecia are provided with several spreading appendages, or branches, each of which is more or less spirally curved at the tip. The ascospores are liberated from the perithecia in the following spring, when they germinate and give origin to the conidial form of the fungus. The conidial form of the fungus was the only one known in Europe until quite recently (1892), when the perithecia were observed in France."

The following is Massee's description of the downy mildew. (*Plasmopara viticola* (Berl and DeToni):—"This destructive fungus is a native of the United States, being parasitic on various kinds of wild vines met with in that country and also on cultivated vines. It was introduced into France about the year 1878, along with American vines that were imported to replace (as stocks) those destroyed by the phylloxera—also a pest of American origin. This mildew attacks the foliage, young shoots, tendrils, flowers, and young fruits of the vine, but usually appears first and is most abundant on the leaves, where its presence is indicated by the appearance of *pale green or yellowish spots on the upper surface*. These spots usually continue to increase in number and size, and gradually change to a brown color as the tissue of the leaf dies. Finally the leaf becomes brittle, and falls often within 10 days or a fortnight of the first indication of disease. Very frequently nearly all of the leaves of a vine are attacked, and their premature fall arrests the development of the fruit, even if the latter is not directly attacked by the fungus. The tree is also so weakened that the production of an average crop of fruit the following year is very doubtful. Soon after the appearance of the pale patches on the upper surface of the leaf corresponding areas on the under surface will be found covered with a very delicate white mildew. This is the fruit of the

fungus [See 2, Fig. 2], which has sprung from the mycelium present in the tissues of the leaf, and has come to the surface through the stomata, or breathing pores, to form its conidia or reproductive bodies in the air, where they have an opportunity of being carried by wind, rain, &c., on to the surface

of other leaves, where, if conditions are favorable (i.e., moistened leaf surfaces), they germinate within a few hours, entering the tissues of the leaf, and thus starting a new centre of disease.

"The conidiophores (hyphæ bearing the conidia or spores) are repeatedly branched near the tip; the conidia are oval and produced in twos or threes at the tips of the branches. [Compare this with similar organs in *Oidium*.] On germination the conidia produce zoospores [see small bodies at 1, Fig. 2, each provided with two motile cilia, by means of which they propel themselves in drops of moisture], which soon become stationary and germinate. A second form of conidial reproduction is sometimes produced late in the season differing from the one already described in the much larger and fewer conidia, which are borne on very short sparingly-branched conidiophores. During the autumn the winter form of fruit or resting spores are produced in great numbers in the tissues of diseased leaves. The tips of certain branches of mycelium present in the leaves become swollen, and after a sexual process of fertilisation assume a spherical form, develop a thick-colored wall, and remain in an unchanged condition in the tissues of dead and fallen leaves. If the leaves decay, the resting spores are not injured, but rest on the soil



FIG. 3.—Mottled bark of vine shoots caused by *Oidium*.

until the following spring, when they germinate, producing two or three conidiophores similar to those growing on the leaf during summer. The zoospores from the conidia of these resting spores, or oospores, being carried in the wind, &c., on to the young vine leaves, germinate, enter the tissues, and in turn produce the mildew or summer form of the fungus."

This last-named fungus was formerly classed in the same genus as the fungus causing Irish potato blight, and its habit of growth during the conidial period affords several close comparisons. For instance, its zoospores must fall on moist leaf or other suitable surfaces, a condition seldom existing for more than a few consecutive hours here whilst the vines are in leaf. Our experience thus far with the potato fungus indicates that its conidial stages make little headway upon the leaves of the summer-growing potato crops, giving hope at any rate that should *Plasmopara* become introduced into our vineyards it would most probably, under exceptionally showery summer conditions only, assume an epidemic form.



FIG. 4.—Leaves, stem, and fruit of vine attacked by *Oidium*.

In confirmation of this Mr. Newton B. Pierce, one of the leading investigators connected with the Division of Vegetable Pathology in the United States of America Department of Agriculture, in comparing the powdery mildew, or *Oidium*, with the downy mildew, points out "these conidia (of *Oidium*) will germinate under conditions of much less humidity than is required for the germination of the conidia of *Peronospora* (the former name given to the

Plasmopara). Heat is one of the most important requirements for the injurious growth of this disease (*Oidium*). Humidity is of rather less importance, as it will thrive on the dry and arid mesas of Southern California, where *Peronospora* would perish. The coast regions, however, where heat and humidity are combined, are most seriously affected."

Reverting again to the subject of the life cycle of the *Oidium* fungus, uncertainty exists respecting its method of passing over the period of dormancy in the host vine. Its outward appearance here may be briefly summarised as follows:—Its presence is usually first indicated in scattered pale-colored patches on the young foliage in which the tissues exhibit brittleness under pressure. The flowers are often likewise attacked, and fail to set in



FIG. 5.—Restricted development of grape berries due to an early attack of *Oidium*

consequence. Usually at this time the bark of the young canes becomes sparingly mottled with dark-grey patches, and concurrently with these the fine felty appearance is often seen on the surface above the pale blotches on the leaves. Very frequently in light attacks the leaf infection would pass unnoticed but for the blotches upon the bark of the shoots turning dark-brown as the canes begin to assume a ripened condition. This latter stage is depicted in the photograph (Fig. 3). If the disease makes headway it shows as a bluish-grey bloom upon the fruit (Fig. 4), which with the diseased leaves give off a peculiar musty or mushroom-like odor. Should the attack be severe, and come while the berries are yet small, they do not develop (Fig. 5), or on attempting to swell burst (see 8, Fig. 1), and decay rapidly, or sometimes shrivel

up into a hard granular condition. The actual injury to the berry appears to consist in the rupturing of the epidermal cells by the haustoria which grow from the under side of the mycelium of the fungus, and these absorb the required nutriment from the host. Under the microscope the skin of the diseased berry soon displays a vast number of dark dots, which are patches of dead cells. These refuse to swell in sympathy with the intussusceptive growth of the cellular tissue within, and the berry bursts. Berries which have survived the attack sufficiently to reach the drying trays are reputed to be very deficient in sugar, a result to be expected under the injuries described above. In the meantime the affected leaves begin to dry, and fall prematurely whilst the ripening canes show the blotches upon the bark in a very dark-brown tint. The hybernating, i.e., winter, period of the fungus is probably passed in Australia in the form of resting mycelial threads located in these dark-brown patches upon the bark of last summer's canes. If this prove correct, it is possible winter treatment may prove more desirable here than in countries where the ascigerous stage is reached and the identity of the *Oidium* with *Uncinula* has been clearly established.

METHODS OF PREVENTION.

The conditions which favor this fungus may be said to be moderate warmth, humidity, shade, and stillness. The temperature necessary may be said to always occur in our vineyards during the spring and early summer months; but the moisture, shade, and absence of drying winds are a combination of desiderata which occur here only under exceptional circumstances. In our average grape plantation only those plants set in low-lying, sheltered spots need suffer.

At Renmark the worst attacks are distinctly located under such conditions, and are by no means constant throughout a ten-acre or even five-acre plot. Neither does the same virulence of attack persist throughout a given row where the trellis extends for several hundreds of feet. In the land which is either naturally stronger or has been deepened and enriched in the process of grading for irrigation purposes, the vines have made exceptionally strong, dense growth, amongst which the disease is rampant. On the other hand, only a few yards away, where the growth is more scanty and the soil palpably poorer, as well as less retentive or absorptive of moisture, the bunches hang almost untouched, and the foliage and canes remain practically uninjured. The first preventive step which under such conditions suggests itself is to train the vine in such a manner as will permit a free passage of air and sunlight beneath and through its various parts. A high trellis with vines trained or growing in such a manner as will clothe it in dense, wide-spreading foliage from the surface of the ground to the tops of the posts possesses little advantage (if any) over a low trellis, and this more particularly when the lines of trellising are 9ft. or 10ft. apart only. A vigorous disbudding which

sweeps away all surplus shoots in the early summer should also assist the individual vines growing in those spots known to be favorable to the disease.

The canes, when pruned, may well be burnt on the spot, preferably through the medium of the burning cart. Where the attack has been severe the swabbing of the spurs and rods retained with a saturated solution of iron sulphate may, as hinted above, prove more useful than is suspected from the practices in vogue in other lands. The main faith of growers in chemical remedies, however, must centre around effective and possibly frequent applications of finely-granulated sulphur from the bursting of the buds in spring onwards. The practice hitherto found efficacious consisted of dusting the flowers of sulphur through a loosely woven piece of sacking, or spraying by means of a dust bellows on to the shoots when possessed of two or three leaves only, and repeating the dressing a little later as the flower clusters appeared on the young shoots.

Whilst finely-divided sulphur may begin to oxidise in a temperature below 70° Fahr., it does not very actively combine with the oxygen of the air unless the thermometer shows a rise of another 15° to 20° in the temperature. The great advantage possessed by the sulphur as a remedy for this fungus lies in the fact that the degrees of temperature which favor the epidemic also cause increased activity in the action of the remedy. In some parts of this State sulphuring vineyards has been carried out from the saddle, which method not only lightens the labor and expense, but overcomes considerably the irritating phases of the application.

The sulphur which falls upon the ground is not wasted, but, on the contrary, owing to the surface of the soil being warmer than the surface of the leaves, it is likely to become available in a fungicidal form more quickly. Further, the sulphur dioxide fumes in ascending from the ground through the foliage are more likely to come into contact with those filaments of the fungus which are growing in and upon the foliage and bunches which are located in the crowded centre of the vine than any generated from the granules fallen upon the exterior surfaces of the foliage. Although individually easy to destroy under the effects of this gas, the grower should be fully seized of the immeasurably great number of conidia, or spores, which are present when an attack of this fungus has reached an advanced stage and the physical difficulty in consequence of bringing all of them into contact with the sulphur gas. Hence it is that measures to be effective should be taken early in the season in a preventive sense rather than with a view to attempting the practically impossible task of curing an advanced attack.

ROSEWORTHY AGRICULTURAL COLLEGE.

HARVEST REPORT, 1910.

By WALTER J. COLEBATCH, B.Sc. (Agric.), M.R.C.V.S., Acting Principal.

THE SEASON 1910-11.

It is many years since the farmers in the Northern wheat-growing areas of this State have experienced such a peculiar, and at the same time puzzling, season as the one that has just passed. In the opinion of many it is without parallel in this district, and the College records go to show that it is, at any rate, unprecedented in the annals of this institution. For convenient reference the rainfall for each month during the past season, and also the corresponding means for the past 28 years, have been summarised in Table I. It will be noticed that the total fall for the year, viz., 23·87in., is 82 points higher than last year's figures, and has only twice been exceeded since 1883.

TABLE I.—*Showing Rainfall in 1910 comparatively with Means of the Preceding 27 Years.*

	1910. Inches.	Mean of Preceding 27 Years. Inches.		1910. Inches.	Mean of Preceding 27 Years. Inches.
January	1·72	.. 0·89	August	1·32	.. 2·13
February . . .	—	.. 0·47	September ..	2·64	.. 1·71
March	4·43	.. 0·76	October	2·55	.. 1·67
April	0·23	.. 1·88	November ..	1·18	.. 1·04
May	3·20	.. 1·78	December ..	0·93	.. 0·75
June	2·81	.. 2·69		—	—
July	2·86	.. 1·88	Yearly total.	23·87	.. 17·65

After the January thunderstorm, which resulted in a precipitation of 1·72in. in two or three hours, we were blessed with bountiful showers in March, and not unreasonably anticipated a fairly long seeding season. During the next 11 weeks, however, less than 1½in. was registered, and it was not till the 26th of May that a really safe seeding rain arrived. This led to a great deal of undesirable rush and hurry with the scarifiers and drills, and it is to be feared that in more than a few cases the work was not done as thoroughly as it should be. Moreover, the drawing out of the seeding season

into the early part of July made it impossible to get the pea paddock sown to advantage, and delayed the important work of fallow ploughing for fully six weeks. No doubt the long, dry spell in March, April, and the early part of May also tended to reduce the area sown to late and mid-season varieties in favor of earlier types. As the season turned out, however, it would have paid better on the lighter lands to have gone on longer with the slower-ripening wheats, as the persistent rains led to serious leaching from the open, porous soils. The lowest returns secured on the College Farm this year were from crops growing on sandy ridges or on light calcareous banks, and there can be little doubt but that this was due to the fact that when the warm growing weather arrived the plants were unable to gather sufficient nutriment from the light water-washed soils, and, in consequence, they "blighted off." The winter was far too mild and soft to promote strong, healthy, vigorous growth; in fact, not one frost severe enough to check back the "proud" growth was recorded. There were only nine rainless days in July, and yet the total fall registered during the month was no more than 2.86in. These figures give an idea of the continuous character of the light winter rains. On the limestone rubbles and the better drained areas of the red clay formation these incessant showers proved very favorable indeed to the growth of natural and self-sown herbage as well as of the crops themselves; but most of our paddocks contain a fair number of claypans and depressions, which held water this season till late in the spring, with the result that at harvest time they were bare of everything except "water-grass" and other like rubbish. Individually, these "lagoons" are small, but taken as a whole throughout the districts concerned they must amount to a very appreciable area. The later-sown crops on the heavier soils likewise suffered a good deal during the germination period from the July soakings, and as these were early wheats this fact throws additional light on the leanness of the returns obtained from cereals of this class. August was a comparatively dry month, and allowed the crops an opportunity of establishing themselves and of making good some of the ground lost during the earlier part of the season. Cold, wet, stormy weather followed in September and October, and it will be noticed in Table I. that the rainfall for each of them was nearly an inch above the corresponding mean of the previous 27 years. Early in October a very severe cold snap was experienced, and snowstorms were reported from numerous centres. This came at a most inopportune time, as it caught many of the wheats when they were just beginning to flower, and irreparable damage was done. The young ovules were destroyed, and later on it was found that many of the heads were quite "deaf," whilst in some localities whole crops were completely ruined and had to be cut for hay. Even in districts like Roseworthy, where no great harm was apparent at the time, it is probable that the more forward heads were nipped, and it seems more likely that the erect empty heads discovered during harvest were the result

of this abrupt change in the weather conditions. Strong, boisterous winds continued throughout the greater part of September and October, with disastrous effects, inasmuch as the crops were not in a condition to stand rough usage. It follows from what has already been said anent the nature of the season that the growth was of a weak, sappy character. There was not sufficient warmth and sunshine during the early spring months to tighten the stalks and give them their normal amount of elasticity. The forward crops suffered most, and the varieties most prone to lodge went down badly. From the time ensilage-cutting started (October 13th) up to the completion of the harvest (January 14th) the season was remarkably free from the usual hot, withering winds; in consequence, harvest operations were carried out under very favorable conditions and almost without interruption.

On the whole it may be said that the season favored the growth of hay and pasture, and led to the development of an undesirable amount of undergrowth in the grain crops. It was not, however, so suitable for oats or early wheats. Many of the unsatisfactory results obtained, however, are due less to the direct influence of the seasonal changes than to the ravages of fungoid diseases such as "takeall," red rust, and flag smut, which the mildness of the season permitted to gain a footing. Fortunately, flag smut (*Urocystis occulta*) and red rust (*Puccinia graminis*) made little headway in the College crops, although they did considerable damage in the adjoining districts. The latter fungus showed up a good deal on the flag and the stem, but did not spread up to the ear, and with the exception of the oat crops, which suffered appreciably, the yields were not seriously affected thereby. "Takeall," on the other hand, appeared in the white head form in several of the wheat fields, notably Ebsary's C and Field No. 6c. Along the headlands of most of the paddocks it was especially noticeable, and probably this is to be accounted for by the fact that they were worked up afresh immediately before seeding and the seedbed was left too open in the bottom—a condition which is known to favor the development of the *Ophiobolus graminis* fungus.

ENSILAGE CROP.

The ensilage mixture was sown in Field No. 3 on an area of 15.49 acres. This field was grazed in 1907 and 1908, and the following season was ploughed up early in the spring. One portion—11½ acres—was sown in September with maize and superphosphate (195lbs. per acre), and on the other part a number of sorghums and millets were drilled in with ½cwt. of bonedust per acre. This crop of summer feed proved to be a particularly heavy one for the district, and if the five acres under pearl millet, which were practically a failure, be excluded, the yield of green fodder per acre was probably higher than has ever been obtained before on the College Farm. The maize plot was siloed and a portion of the sorghum was cut and chaffed into the silo;

the balance of the field was grazed off, and carried 54 head of cattle (25 being in milk) for a month and six horses for a week. Considering the light stony nature of the land, and bearing in mind that when the stock were turned in there were only about 13 acres of standing crop, the remainder being stubble, these figures are by no means unsatisfactory for this district. The stock were drawn out on the 16th of March, and the stalks were then scarified up, harrowed into heaps, and burnt. Early in April 230lbs. of superphosphate per acre were drilled in, and the silage mixture was broadcasted about a week before the first seeding rains fell. King's Red wheat (79lbs. per acre) and Calcutta oats (Mount Gambier seed, 42lbs. per acre) were sown in admixture with either 10lbs. of vetches or 10lbs. of Tick beans per acre. The ensilage block corresponded roughly with the areas that carried maize and *Pencillaria* during the preceding summer, and was broadcasted in May with about 5½lbs. of lucerne per acre for the purpose of improving the quality and amount of stubble feed. Germination took place in patches before the advent of useful rains, but the field rapidly recovered and made promising growth during the winter and early spring. The crop was too rank and sappy, however, to stand up against the squally winds that swept over the district in September. Cutting commenced on the 13th of October, and considerable difficulty was experienced on account of the extent to which the crop had been beaten down. In all 134 tons 1cwt. 43lbs. were led on to the bridge and subsequently ensiled. The yield per acre works out at 8 tons 15cwts. 32lbs., which is 1cwt. 83lbs. above the average return obtained during the years 1905 to 1909. The appended table summarises the yields of ensilage since 1904 :—

TABLE II.—*Showing Average Yields of Mixed Cereals and Legumes Cut for Ensilage.*

	Yield per Acre. Tons cwts. lbs.		
1905	8	10	0
1906	11	18	0
1907	5	7	34
1908	7	12	44
1909	10	0	3
1910	8	15	32
Average, 1905-1909	8	13	61
“ 1905-1910	8	13	93

THE EQUIVALENT AS HAY OF GREEN STUFF CUT AS ENSILAGE.

In 1906 Professor Perkins commenced an investigation into the relation-ship existing between the yields obtained from cereal mixtures when cut green (for ensilage) and when made into hay. These tests were carried out

again this year, and the results are significant. As formerly, 50 of the sheaves cut for ensilage and weighing in all 1,040lbs., were stooked for three weeks in a paddock, and then reweighed to ascertain the loss on drying. The figures given below summarise the results obtained since 1906 :—

TABLE III.—*Showing Hay Equivalent of Green Stuff Cut for Ensilage.*

Seasons.	Weight of 50 Sheaves.		Percentage of Loss on Drying.	Hay Equivalent of 10 tons of Green Stuff.		
	Green.	Dry.				
	lbs.	lbs.	per cent.	Tons	cwts.	lbs.
1906	830	250	69.5	3	1	0
1907	950	280	70.5	2	19	0
1908	950	315	66.8	3	6	45
1909	900	255	71.7	2	16	67
1910	1,040	290	72.1	2	15	86
Average, 1906-09	908	275	69.7	3	0	67
" 1906-10	934	278	70.1	2	19	59

On reference to the hay returns from Field No. 3 it will be seen that the calculated yield of hay per acre given in Table III. is 1 ton all but 16lbs. less than the actual return from that portion of the field which is similar in character to the area under ensilage. This may be explained in great measure by the fact that King's Red wheat is about the earliest of the wheats grown, and owing to the continuance of warm, moist weather throughout the spring months very rapid growth occurred between ensilage-making and hay-cutting. Again, the Calcutta oats were only just coming into ear when the 50 sheaves were cut for drying, whereas at the time the hay was mown they were in full flower. A large amount of undergrowth also sprang up in October and swelled out the butts of the hay sheaves. Furthermore, it should be observed in this connection that the crop contained an abnormal amount of water in the middle of October, as shown by the weight of the green sheaves. To this condition is due the very high percentage of moisture lost in drying.

HAY CROPS.

When the scheme of cropping for the year was drawn up it was intended to cut for hay the balance of Field No. 3 (about 30 acres) and two small fields on "Grainger's" block. Owing to the peculiarities of the season and the prevalence of "takeall," however, it was deemed advisable to include in addition the whole of Ebsary's C and a small portion of The Island, both of which had been sown for grain.

FIELD No. 3.

Reference has already been made to the recent history of this field, and it only remains to give in a summarised form the treatment which it has received since 1897.

1897.....	Grazed	1904.....	Bare fallow
1898.....	Wheat	1905.....	Wheat, oats, and barley
1899.....	Grazed	1906.....	Rape (catch crop)
1900.....	Oats	1907.....	Grazed
1901.....	Grazed	1908.....	Grazed
1902.....	Oats	1909.....	Summer crop
1903.....	Grazed	1910.....	Ensilage and hay.

Of the portion under hay about $18\frac{1}{2}$ acres had previously carried a summer crop. The western side of the field is of a stiff, tenacious character and liable to become water-logged in a wet season; the eastern side, on the other hand, is a light, brashy, limestone bank, thickly studded with stones. The $18\frac{1}{2}$ acres consist of the lighter class of soil, and prior to seeding received precisely the same preparatory treatment as the ensilage block. During the first week of May King's Red wheat (70lbs.) and Calcutta oats (40lbs.) were broadcasted as a mixture on one portion of this area, whilst another portion received in addition 10lbs. of Tick beans. In a third block 10lbs. of vetches were substituted for the beans. About seven and a half acres of the stiffer land received the same preliminary treatment as the above, and on the 6th of May was broadcasted with a mixture of 70lbs. of Kleefah wheat and 40lbs. of Calcutta oats per acre. The remaining four acres (virgin land) were ploughed for the first time between the 1st and 4th of May, and subsequently rolled, cultivated, and harrowed into good tilth. On the 7th of May King's Red wheat (70lbs.) and Calcutta oats (40lbs.) were put in with the drill. The whole field received a dressing of 230lbs. of 36.38 per cent. superphosphate and a light seeding (5lbs.) of lucerne. The seed germinated very irregularly; but, with the exception of about two acres of the Kleefah mixture, which was drowned out in the winter, the crop made a wonderfully good recovery. This is all the more remarkable as a heavy summer crop is apt to leave the land too impoverished in moisture and dry and powdery in consistence to permit of strong and rapid growth. As mentioned before, however, the season was favorable to hay crops, and this paddock rather tended to become over-rank; in fact, had it been a grain crop, it might with advantage have been grazed down in the early part of the winter. Red rust and "takeall" appeared to a slight extent in this field, but they were mostly to be seen along the edges, and no great harm can be attributed to them. From the total area (31.15 acres) were cut 108 tons 9cwts. 52lbs., which works out at an average of 3 tons 9cwts. 72lbs. per acre. It is important to notice that the hollow-strawed wheat, King's Red (*Triticum sativum*), yielded a higher average than the solid-stemmed Macaroni wheat, Kleefah (*Triticum*

durum). The former gave a return of 3 tons 15cwts. 7(lbs. per acre over an area of 23·659 acres, and the latter 2 tons 10cwts. 65lbs. per acre over 7·491 acres. This is the first time these two species have been tested as hay wheats on the College weighbridge, and the result confirms the impression previously held that under our conditions the improved types of King's Early are the most suitable wheats for hay-growing purposes.

GRAINGER'S B.

This is a portion of the property purchased in 1909, and comprises in all about 50 acres; but of this area only 5·453 acres were under crop this season, the balance being fallowed. Of the past history little is known. The portion that carried hay this season was under barley in 1908 and was fallowed in 1909. In July the field was ploughed up, and subsequently treated in the same way as Grainger's C. On the 24th of May it was cultivated and drilled with 2cwts. of superphosphates and 120lbs. of King's Red (selection 2) per acre. On the following day 6½lbs. of Hunter River lucerne were sown broadcast through the Cahoon seeder and harrowed in. Germination was satisfactory, and the crop made good growth during the winter, but it suffered a good deal in the spring from the September and October gales, and in parts went down badly. Cutting began at the end of October, and the field yielded altogether 16 tons 6cwts. 33lbs. of hay. This works out at an average return per acre of 2 tons 19cwts. 98lbs.; but the yield would probably have been considerably higher but for the fact that 3·87 acres adjoining the road had been used during 1909 as a sheep camp. It is well known that an overabundance of animal droppings tends to promote over-rankness of growth with cereals, and that such crops are very liable to "blight off" on the approach of warm weather. This is precisely what happened in this field, as is shown by the following figures:—From the 3·87 acres on which the sheep had been boxed at nights only 2 tons 17cwts. 101lbs. per acre was secured, whereas the balance of the block—1·58 acres—yielded 3 tons 4cwts. 66lbs. per acre. Apart, however, from the actual returns the appearance presented by the "blighted" crop was characteristic of the effects of overmanuring with animal excreta.

EBBARY'S C.

There are 38·478 acres in this field, and the soil is mostly a loose, calcareous loam. At the southern end is a sandy pine ridge, but towards the northern boundary the soil becomes heavier and more difficult to work. Its past history is as follows:

1899..... Fallowed	1905..... Pasture
1900..... Wheat	1906..... Fallowed
1901..... Fallowed	1907..... Wheat
1902..... Wheat	1908..... Rape
1903..... Fallowed	1909..... Fallowed
1904..... Barley	1910..... Wheat (cut for hay)

The cropping returns from this field since 1906 have been very disappointing. The wheat crop in 1907 yielded 4.22bush. per acre; the rape in the following season was only half a crop, and worth very little as a forage. This season the wheat crop germinated evenly and vigorously, and at the time of the farmers' visit the field promised as well as any crop on the farm; yet at the end of October it was decided to cut it for hay. No doubt the incursions of the "takeall" fungus contributed its quota to the disastrous "blighting off" that too place during the first fortnight in October, but I am inclined to think that the leaching of the land by the persistent winter rains was mainly responsible. On the 16th of August fallow ploughing was started, and during the late spring the soil was scarified, rolled with a heavy Crosskill roller, and finally worked down with a spring-toothed cultivator. A flock of 200 sheep was turned in to graze off the growth of weeds that sprang up after the January thunderstorm. In March it was again scarified, and at the close of April the cultivators and harrows were used to form the seedbed. Sowing took place on the 11th and 12th of May, the variety used being Bearded Gluyas. Part of the seed was broadcasted at the rate of 90lbs., and the remainder drilled with 85lbs. per acre. As usual, 2cwt. of 36-38 per cent. superphosphate per acre were drilled in over the field. Finally the lower-lying portion of the paddock (about 17 acres) was broadcasted with about 3½lbs. of lucerne seed per acre. The binders were set going in November, and the total weight of produce hauled to the steading was 64 tons 10cwt. 85lbs., which gives an average return per acre of 1 ton 13cwt. 61lbs. These figures are not satisfactory, but then it must be remembered that the field was not sown for hay, and that Bearded Gluyas is by no means a first-class hay wheat, being far too thin and light in the straw to yield a heavy bulky crop.

GENERAL HAY RETURNS.

In comparing the general average return of hay this season with the yields obtained in previous years only those fields which were intentionally sown with hay crops are taken into account. It would be obviously misleading to include crops originally sown for grain which the vagaries of the season have forced into the hay harvest. The capacity of the College land for producing hay can only be gauged by reference to the returns obtained year by year from what may be termed "*bona fide* hayfields," that is, fields sown at the right time, with the right varieties, and with the proper amounts of seed and manure per acre. In Table IV., therefore, the yields obtained from Field No. 3 and from Grainger's B have been included, but no attention has been paid to the crops cut in Ebsary's C, The Island, or the headlands.

TABLE IV.—*Showing Hay Yields on College Farm from 1904 to 1910.*

Year.	Rainfall.	Area.	Yields per Acre.			
	Inches.	Acres.	Tons	cwts.	qrs.	lbs.
1904	14.70	93.0	2	11	0	22
1905	16.71	60.3	3	5	2	11
1906	19.72	93.0	2	11	3	6
1907	15.05	51.0	1	15	3	24
1908	17.74	112.8	2	7	0	5
1909	23.65	145.3	2	15	2	12
1910	23.87	36.6	3	8	0	21
Average, 1904-1909	17.65	—	2	11	0	23
“ 19.04-1910	17.89	—	2	13	2	14

Thus it is seen that the hay crops proper have given higher returns in the season 1910-11 than in any previous year since the records were kept, and when compared with the mean of the preceding six years the difference is found to be nearly 17cwts. in favor of last season's crop. The total area covered by the "blighted" and diseased crops cut for hay, together with the headlands, was 58.3 acres, and yielded 99 tons 11cwts. 33lbs., or 1 ton 14cwts. 18lbs. per acre. The real average return of hay for 1910 is therefore more than double the yields obtained from the areas accidentally included in the hay harvest. The headlands (including 5.715 acres in The Island) comprised an area of 19.828 acres, from which 35 tons 60lbs. were harvested, but owing to the effect of the boundary trees and scrub growth, the ravages of "takeall," and the trespassing of rabbits and kangaroo rats a high average is never anticipated from this source, and the acre yield this year (1 ton 15cwts. 37lbs.) is quite satisfactory. The total quantity of hay put in the stack was 224 tons 7cwts. 6lbs., and the total area reaped for hay, 94.91 acres.

BARLEY.

The barley crops this season were above the average, although they were shorter in the straw and less bulky than usual. They did not ripen off so rapidly owing to the mildness of the season, but the sample obtained was nice and plump, sound, and of a good color. The two main crops were in Fields No. 16 and The Island A, and a small area was also sown in Field No. 6A.

FIELD No. 16.

Although the soil in this field is either limestone rubble or loose sand, it was decided to sow it with a second white strawed crop before allowing it to fall back into grass again. From the subjoined history it is seen that it has only carried one cereal crop since 1905, and as barley as a rule follows

wheat well in this district, provided the land is in good heart, it was thought that good results would follow the adoption of this rotation in respect of Field No. 16.

PAST HISTORY.

1899..... Bare fallow	1906 Pasture
1900..... Wheat and oats	1907..... Pasture
1901..... Bare fallow	1908..... Bare fallow (partly), white mustard
1902..... Wheat	(partly)
1903..... Pasture	1909..... Wheat
1904..... Pie melons and pumpkins	1910..... Barley
1905..... Barley and rye	

The wheat stubble was heavily stocked with sheep to clean up the feed and prepare the way for the plough. From February 10th to April 8th 212 sheep were grazing on it. Part of the paddock was ploughed up in March after the heavy rains, but the work was not completed till the first week in June. It was worked down immediately after and drilled with the under-mentioned barleys and manure between the 20th and 24th of June. This was the last field sown for the year, but the seed germinated evenly and well, except on the upper slopes of the sand ridge. In August the whole field was rolled, and from that time forward the crop made strong, sturdy growth. The crop was harvested with the string binder in the last week in November, and subsequently put through the thresher. The appended table gives a summary of the results obtained :—

TABLE OF YIELDS, FIELD NO. 16.

Variety.	Area.	Seed per Acre.	Manure per Acre (Super).	Total Yield.		Yield per Acre.	
				bush.	lbs.	bush.	lbs.
Short Head (selection 3)	57.7	68	224	2,183	36	37	42
Short Head (selection 2)	3.537	68	224	162	11	45	43
Cape	6.9	68	224	392	43	56	47
Whole Field	68.137	—	—	2,738	40	40	10

ISLAND A.

In 1908 this field was fenced off from the rest of The Island, and last year it was sown early in the autumn with rape and bonedust. This crop was fed down during the winter. The following May the field was turned over with the skim plough and the weeds, chiefly stinkwort, were harrowed into lines and burnt. The soil is of a light sandy character, and was easily reduced

to a fine tilth. About the middle of June Square Head (selection 4), Roseworthy Oregon (selection 2), and Short Head (selection 2) were drilled in at the rate of 72lbs. with 2cwts. of mineral superphosphate per acre. The growth in this field was for the most part unusually dwarfed, and the yields in consequence considerably below the general farm average for barley; but this again is due to the nature of the soil, and in all probability that portion of Field No. 16 which was referred to as being of a similar character yielded no better than the crop now under consideration. The Square Head was stripped early in December, as was also a part of the Roseworthy Oregon. The whole of the Short Head and the remainder of the Roseworthy Oregon was cut and threshed just before Christmas. The reason for altering the method of harvesting in this field was the prostrate condition of the western portion of the crop. Even with the binder it was impossible to recover it all, and a good sprinkling of grain was left in the paddock. From the stripped portion of Roseworthy Oregon an average return of 29bush. 17lbs. was winnowed, which is slightly above the acre yield for the field. The Short Head block being so small, and on account of the grain being required only for feeding purposes, it was not necessary to spend a couple of hours in cleaning the thresher in order to keep the figures separate. The tabulated results are given below :—

TABLE YIELD. ISLAND A.

Variety.	Area.	Total Yield.	Yield per Acre.
	Acres.	Bush. lbs.	Bush. lbs.
Square Head (selection 4)	14.401	323 8	22 22
Roseworthy Oregon (selection 2)	18.544	626 30	32 0
Short Head (selection 2)	1.04		
Whole Field	33.985	949 38	27 47

FIELD NO. 6A.

The history of this field will be given in the section of the report dealing with the wheat harvest. The point of interest just here is that it carried the only barley crop sown on fallowed land this season. Fifty pounds of seed and 2cwts. of superphosphate per acre were sown under fair conditions on the 10th and 11th of June. Three varieties were used, viz., Square Head (selection 5), Short Head (selection 4), and Roseworthy Oregon (selection 3). The plots made stronger, ranker growth than any other barley plots on the farm, but, as in former years, the first-mentioned variety failed to return such high yields of marketable grain as either of the other two. The crop

was cut with the binder and put through the English thresher with the following results :—

TABLE OF YIELDS, FIELD NO. 6A.

Variety.	Area.	Total Yield.		Yield per Acre.	
	Acres.	Bush.	lbs.	Bush.	lbs.
Square Head (selection 5)	5.697	198	41	34	45
Short Head (selection 4)	3.004	175	18	58	19
Roseworthy Oregon (selection 3)	2.600	155	11	59	35
Whole Field	11.301	529	20	46	42

GENERAL BARLEY RETURNS.

The barley yields have been a long way the most pleasing of all the grain yields this season. The general average was 1bush. 18lbs. above the mean return of the preceding six years, and in one instance (Roseworthy Oregon, selection 3) the yield rose to within 15lbs. of 60bush. to the acre. The total area under barley was 113.42 acres, and the average yield per acre over that area was 37bush. 9lbs., which raises the mean return since 1904 a matter of 11lbs. per acre. The high yields obtained in Field No. 6A emphasise the fact that although barley is capable of following a good crop of wheat successfully, yet it responds well when sown on land that has been thoroughly well fallowed. The light sandy land caused a very material lowering of the general average. Even if we exclude only The Island A, and overlook the fact that a part of the crop in No. 16 was also on sandy soil, the average yield jumps to 41bush. 7lbs., an increase of nearly 4bush. per acre. The appended table sets out the yearly returns since 1904.

TABLE V.—Showing Barley Yields on College Farm from 1904 to 1910.

Year.	Rainfall.	Area under Barley.	Yields per Acre.	
	Inches.	Acres.	Bush.	lbs.
1904	14.70	27.86	38	33
1905	16.71	65.73	25	4
1906	19.72	51.00	40	38
1907	15.05	79.30	31	21
1908	17.74	94.83	43	49
1909	23.05	75.27	35	0
1910	23.87	113.42	37	9
Average 1904-1909	17.65	—	35	41
Average 1904-1910	17.89	—	36	1

(To be continued.)

AGRICULTURAL EXPERIMENTS, 1910.

By A. E. V. RICHARDSON, M.A., B.Sc. (Agric.), Acting Director of Agriculture.

One of the most potent ways of influencing the agricultural practice of a given district is the introduction of agricultural experimental plots, under the management of some capable and reliable farmer of that district. This is recognised by most of the various Agricultural Departments of the Commonwealth, and as a result we have what are termed farmers' plots scattered through the States. Though only recently introduced into this State, the work done is already of considerable value, not only to the various districts in which they are placed, but also to the State at large. These farmers' experimental plots always excite the interest and curiosity of the neighbors, and as they are always planned to test some definite agricultural practice they not unfrequently come in for vigorous criticism. To the farmers who undertake these experiments the Department of Agriculture and the producing community at large are under a deep sense of obligation, especially as in most cases the experiments involve much tedious work and loss of valuable time at the busiest seasons of the year. These plots, whatever the result may be, are always educational, especially when detailed notes are made by the experimenter during the growth of the crop; and to the individual who is eager for knowledge what are called failures are often as instructive as the successes.

The most popular experiments are the variety wheat and the manurial tests. Through the variety wheat tests the Department has been enabled to bring before the producing public varieties which have displaced those in vogue a generation ago. In the near future it is hoped that the sphere of usefulness of these plots will still further be extended, and that by them, in conjunction with the Government experimental farms, newer creations from the wheat-breeding stations of the States may be thoroughly tested and proved before being recommended to the primary producer. In the meantime, by proper co-ordination and by systematic working of these experimental plots, the best of the present-day varieties can be simultaneously tested over a range of soil and climatic conditions, and accurate information gained as to their general utility for a given district. Not less important are the manurial tests, planned to gain exact information on the soil's requirements for a series of years.

1. MANURIAL TESTS.

One of the most interesting and carefully conducted of these manurial plots is that on the farm of Mr. F. Coleman, of "Tuela," Saddleworth. On this farm 16 half-acre plots were mapped out at the commencement of the tests, and one-half of the plots were fallowed each year. By taking care to place the same manurial plots in precisely the same position each alternate year it will be seen that a set of permanent experimental plots has been evolved, and the results of these will be increasingly valuable as the years go by. Such a set of plots is a replica, with local modifications, of the famous Rothamsted plots; and as a result of Mr. Coleman's careful and patient work we are in a position as a result of six years' work to know with some accuracy the manurial requirements of land similar to that at Saddleworth. Table I. summarises the results:—

TABLE I.
COMPLETE & INCOMPLETE MANURES FOR WHEAT. —(F. Coleman, Saddleworth.)

	Year.	Plot 1. 1cwt. Min. Super.	Plot 2. 1cwt. Min. Super. 5cwt. Lime	Plot 3. 1cwt. Min. Super. 1cwt. Sulph. Potaash. 1cwt. Nit. Soda.	Plot 4. 1cwt. Bone Super.	Plot 5. No Manure.	Plot 6. 1cwt. Min. Super. 1cwt. sulph. Potaash.	Plot 7. 1cwt. Sulph. Potaash. 1cwt. Nit. Soda.	Plot 8. 1cwt. Min. Super. 1cwt. Nit. Soda.
		Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
	1905	31	29½	33½	34½	29½	35	30½	33½
	1906	32½	34½	32½	34	23½	33½	24½	26½
	1907	35½	38½	39½	36½	24½	35½	25½	35½
	1908	17½	19½	21	17½	7½	19½	5	19
	1909	31½	33	35	30½	24½	29½	23½	33½
	1910	21	22½	25½	26½	15½	28½	15½	29½
Average for six years ..	—	23½	29½	31	30	21	30½	21½	31½
		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Cost of manure per acre ..	—	4 0	9 10	18 0	5 6	—	11 0	14 0	11 0
		Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
Average increase per acre over unmanured crop ..	—	7½	8½	10	9	—	9½	½	10½
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Value of increase per acre at 4s. bushel	—	1 9 0	1 14 0	2 0 0	1 16 0	—	1 17 0	0 2 0	2 1 0
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Net profit or loss per acre over unmanured crop ..	—	1 5 0	1 4 2	1 2 0	1 10 6	—	1 6 0	0 12 0	1 10 0
		Net profit.	Net profit.	Net profit.	Net profit.	—	Net profit.	Net loss.	Net profit.

The above table sets out very clearly the manurial requirements of land similar to Saddleworth. The addition of 1cwt. mineral super. has resulted in a net increase over the unmanured crop of 7½bush. per acre which, after

deducting the cost of manure, leaves a net profit over and above the unmanured crop of £1 5s. per acre. The addition of 5cwts. of lime certainly increases the yield; but if we deduct the increased cost of the manurial application, we find the net profit to be slightly lower than the mineral super. alone. Similarly a complete manure gives a gross increase of £2 per acre, but a net return of £1 2s. Bone super. has proved the most profitable application, since it has given a net increase of £1 10s. 6d. per acre. This table clearly proves the necessity for continued application of phosphates, but it also shows that little is to be gained as yet from nitrogenous and potassic applications. How long this is to continue can only be found out by further experiment. We might infer, however, from the geological formation of this class of country that potash is not likely to be one of its deficiencies. Nor, indeed, when we consider the comparatively high content of organic matter of these Bay of Biscay soils, need we be surprised at the comparatively little response to nitrates. Good fallowing, here, as in other portions of the State, has stimulated the activity of the nitrifying organisms of the soil to such an extent as to enable them to supply by their ceaseless activity the quota of available nitrogen necessary for the crop. It is fortunate, indeed, that South Australian soils do not need the application of nitrates, since the cost of production would be considerably increased if nitrogenous manures were absolutely necessary for profitable farming.

2. WHEAT VARIETIES TEST.

As pointed out above, these are very valuable tests, as they draw the attention of the producing public to the relative merits of the different varieties of wheat on the market, and they serve as well to introduce and test new varieties of seed against the best of those in general cultivation. At the same time they illustrate what has been emphasized again and again, that what obtains in one district of the State does not necessarily hold true for another district—that each district, as a matter of fact, has to settle its own agricultural problems by the light of actual experiment.

Variety tests have been carried out by Mr. W. F. Nicholls, Narridy; Mr. R. Barr, jun., Bews; Mr. T. Pengilly, Aldinga; Mr. T. Freeman, Bagster; Mr. T. Griffin, Hammond; Mr. A. E. Lovegrove, Streaky Bay; Mr. W. T. Vigar, Rhine Villa; Mr. F. Lehmann, Caltowie; Mr. J. Schuppan, Wilmington. In describing the results of the departmental experiments Mr. Nicholls says, *inter alia*, "Perhaps the only disappointment of the whole eight plots is the comparative failure of Federation. This plot was badly affected with 'takeall,' which wrought such havoc throughout this district this year. In justice to this variety, however, I might mention that a crop of Federation of 80 acres in the same paddock averaged 22bush. to the acre. None of the other varieties was seriously affected with 'takeall,' but red rust was present

on all the varieties. A special feature of the results is the comparatively high yields of the three late varieties—Yandilla King, Tarragon, and Marshall's No. 3; but the extraordinary lateness of the season, with continued showers till Christmas, has favored these varieties to an unusual degree. The returns from Bunyip and King's Red must, however, be regarded as very satisfactory, and the fact that these varieties were ripe fully three weeks before the Tarragon must have told much in their favor in a hot, normal season."

A.—NARRIDY (W. F. Nicholls).

Variety.	Yield.	
	Bush.	Lbs.
Yandilla King	25	23
Tarragon	23	1
Bunyip	22	59
Marshall's No. 3	22	49
King's Red	22	44
Gluyas	19	51
Federation	13	31
Comeback	12	32

Sown on May 23rd and 24th, with 1cwt. mineral super. per acre; rainfall from seedtime to harvest, 13.82in.

B.—HAMMOND (T. Griffin).

Variety.	1908.	1909.	1910.	Average for 3 Years.
	Bush.	Bush.	Bush.	Bush.
Special Comeback	—	17½	27	—
Cumberland	—	15½	22½	—
Federation	8½	14½	28½	17
Pratt's Comeback	8	14½	27½	16½
Gluyas	7½	16½	24½	16½
Viking	8	16½	21½	15
Yandilla King	7½	12½	22	14
John Brown	7½	8½	18½	11½

Sown on April 25th and 26th, with 60lbs. mineral super. per acre; rainfall from seedtime to harvest, 14.39in.

From the above table it will be noted that in spite of the good spring rains which fell in this district the late wheats have not done as well as the early wheats. A pleasing feature of the results is the relatively high yields of Special Comeback. This variety is, with Bobs, by far the best milling wheat on the market, and it is satisfactory to know that in the Far North it is a worthy competitor for prolificacy. Federation has here maintained its reputation as a yielder.

C.—BAGSTER, WEST COAST (T. Freeman).

Variety.	1907.	1908.	1909.	1910.	Average for 4 years.
	Bush.	Bush.	Bush.	Bush.	Bush.
Special Federation	—	—	—	16½	—
Gluyas	16	10½	15½	14	13½
Nhill	13	12	14½	13	13½
King's Early	11	12½	15	12½	12½
Boomerang	11½	10	9½	11½	10½
Smart's Early	8	10	9½	14	10½
Dart's Imperial	4	8	14½	14½	10½
Comeback	8	12	9½	11½	10
Allora Spring	8	8½	12	10½	9½
Yandilla King	4½	9	12½	13½	9½
Marshall's No. 3	5	8	12½	13½	9½
Carmichael's Eclipse	7½	7½	10	14½	9½
Red Straw	6	8	8½	13½	8½

Sown on April 30th, with 65lbs. super. per acre.

Federation was grown here for the first time last season, and has established a comfortable lead on the other varieties.

D.—STREAKY BAY, WEST COAST (A. E. Lovegrove).

Variety.	1907.	1908.	1909.	1910.	Average for 4 Years.
	Bush.	Bush.	Bush.	Bush.	Bush.
Federation	4½	20½	20½	26	17½
Dart's Imperial	2	11½	17½	24½	14
Yandilla King	3	12	16½	21½	13
Carmichael's Eclipse	4½	12½	11	22	12½
Comeback	2	11½	12½	22½	12
Gallant	2	10½	10½	21	11

As at Bagster so with Streaky Bay, Federation has given the highest yield for the season and the highest average yield since the inception of the plots, followed closely by Dart's Imperial, Yandilla King, and Carmichael's Eclipse. The whole of the plots were sown with 80lbs. super. and 60lbs. of seed.

E.—BEWS (R. Barr, jun.).

In an interesting letter in which Mr. Barr describes his results he states—
 "The results can only be classed as unsatisfactory. I believe when putting in the plots that the land chosen would have given the best results on the farm, and it proved absolutely the worst. The whole of my crop was seriously affected with 'takeall,' and only on the poorer soils was there anything like a decent crop. The land was fallowed well; all weeds were kept down by cultivation, and the seed went in beautifully, and in September

the crop looked like 20bush. to the acre. Thence onward 'takeall' appeared, and I reaped the miserable average of 3bush. 50lbs."

The averages for the last five years' experimental work at Bews are—

Year.	Bush. Lbs.	Rainfall.
1906	21 40 ..	16.75
1907	12 54 ..	13.44
1908 (takeall)	6 20 ..	18.37
1909	18 52 ..	16.07
1910 (takeall)	3 50 ..	20.65

The average yields of the different varieties are as follows:—

Variety.	1905.	1906.	1907.	1908.	1909.	1910.	Average for 6 Years.
	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
Dart's Imperial	16½	22	12½	7½	22½	3½	18
Gluyas	16½	19½	14½	7	24½	7½	15
Yandilla King	13½	23	8½	7½	23½	3½	13½
Phillis Marvel	10½	22½	14½	6½	19½	3½	13
Marshall's No. 3	11½	21½	13½	6½	18½	2½	12½
Silver King	13	22	12½	6½	17	4½	12½
Carmichael's Eclipse	10½	21½	14½	6½	14	5½	12
Federation	10½	19½	14½	6½	18	3	12
Comeback	9½	23	14½	4	13	3½	11½

HAY TESTS.

A.—ALDINGA (T. Pengilly).

Mr. T. Pengilly has been conducting a combined grain and hay test, whereby the yield of a given set of plots has been expressed as hay and as grain. The plots were sown in the usual manner, but at harvest one-half was cut and weighed as hay whilst the remaining half was allowed to mature and was reaped for grain.

Sown with 1½cwts. bone super. and 90lbs. seed to the acre—

Variety.	1908.		1909.		1910.	
	Hay.	Grain.	Hay.	Grain.	Hay.	Grain.
	Tns. c. lbs.	Bush. lbs.	Tns. c. lbs.	Bush. lbs.	Tons c. lbs.	Bush. lbs.
Gallant	2 17 26	24 19	2 3 25	16 36	2 8 20	4 32
Baroota Wonder	2 11 99	21 14	2 12 0	15 14	1 13 49	6 16
White Tuscan	3 12 102	28 45	2 18 99	21 8	3 0 40	8 38
Triumph	2 5 11	19 1	2 3 34	16 11	2 2 31	8 22
Majestic	3 10 2	27 21	1 12 96	12 0	—	—
Silver King	2 9 57	24 8	1 14 79	13 35	1 15 91	3 16
Yandilla King	2 8 67	24 42	1 12 27	13 33	1 6 59	6 58
Dart's Imperial	—	—	2 3 86	16 33	1 17 56	5 56
Huguenot	—	—	—	—	3 0 10	8 39

The grain yields this season were seriously interfered with by ravages of "takeall," which was very prevalent in the district, and also by rough weather at harvest time, which caused considerable shaking out and lodging. The quantity of stubble warranted a much larger yield of grain. The heaviest hay yields were White Tuscan and Huguenot, both scaling slightly more than 3 tons per acre. White Tuscan has easily topped both the grain and hay yields for three consecutive years, and we are justified in concluding that it is one of the best all-round hay wheats in this district. When it is considered that the hay crop from this variety was not only exceptionally heavy, but was also of prime quality, one can see the great advantage such a wheat would be to the farmers of the district. That the farmers are not slow to recognise its worth is proved by the fact that since the inauguration of the plots at Aldinga White Tuscan has superseded the varieties in general use for hay a few years ago, and is now extensively grown throughout the district. Other varieties which have done well are Baroota Wonder and Triumph.

CROSS-DRILLING FOR HAY.

At the Conference of the Northern Branches of the Agricultural Bureau at Caltowie some three years ago a discussion arose as to the merits of cross-drilling for hay crops. The Department offered to test the matter provided a member of the Conference would supply the land. The work was entrusted to Mr. F. W. Lehmann, of Caltowie. One hundred and twenty pounds of super. and 80lbs. of seed were sown with the drill on each plot of three acres. In Plot No. 1 40lbs. of seed was first drilled in, and a second 40lbs. sown at right angles to the first. In Plot 2 the whole quantity—80lbs. of seed per acre—was sown in one operation. The results were—

	Tons, cwt., lbs.		
1. Cross-drilled plot	2	16	0 per acre
2. Drilled in the usual way	2	7	0 "
<hr/>			
Difference in favor of cross-drilling	0	9	0 per acre

Mr. Lehmann reports that the cross-drilled plot looked at one time a ton per acre better than the other plot, but a portion of the cross-drilled plot was spoiled with excessive water. After deducting the cost of drilling from the extra value of the cross-drilled plot, it is apparent that a substantial margin of profit is gained from the cross-drilling. The practical objection to this mode of drilling is, of course, the delay and extra work involved. Since our seeding season lasts at best for a very short period, it is obviously wise to concentrate the whole working strength of the farm on getting in the seed with all possible dispatch while the conditions are favorable, and unless a fair margin of profit accrue from cross-drilling it is questionable whether most

farmers will adopt it as a regular practice. It will be therefore of interest to know what the relative average returns of these two modes of working will be when taken over a period of years.

“ TAKEALL.”

Many complaints of the ravages of “ takeall ” (*Ophiobolus graminis*) have been made this season, and very few experimenters have escaped from this scourge. The disastrous nature of the disease is sufficiently indicated in Mr. Barr's experiments, which are quoted above. A report on the prevalence, symptoms, and remedial measures has already appeared in this *Journal* (December, 1910), and opportunity was there taken to call attention to the need for the appointment without delay of a skilled vegetable pathologist.

(To be continued.)

PRODUCE EXPORT NOTES.

The Trades Commissioner writes as follows :—

London, December 9th, 1910.

Apples for Germany.—On the 5th instant I cabled “ Apples Germany prospects good.” After making considerable inquiries in regard to prospects for the coming season in Germany, I came to the above conclusion, and thought it might be of some assistance if I cabled the information out. American apples have proved to be of unsatisfactory quality this year, and shipments to Germany will be finished when the first steamer of apples from Australia will arrive. Last season about 90,000 cases were shipped to Germany. Larger quantities could have been disposed of, but on account of the steamers having no more room, imports had to be confined to the above-mentioned quantity. I am advised that the German Austral Line is now

building a steamer which will have space for 50,000 cases, and this steamer will be put into service in 1912, so I trust space will be gradually increased by and by, and that a business of great importance will be built up. A few years ago buyers in Germany preferred a few varieties, viz., Cleopatras, Jonathans, and Dunn's Seedlings, while other varieties, not being so much known, were neglected. This has somewhat changed now; buyers and consumers being more acquainted with the different Australian varieties, and Spitzbergs, Garibaldis, Spies, and Munroe's Favorites—in fact, nearly all varieties—are now well known. French Crab is perhaps the only variety which is underestimated. It is very advisable to have careful grading; poorly-graded lots will make a poor showing on arrival, and will naturally fetch lower prices.

The imports of Australian pears are yet very limited in Germany, owing to the fruit being tender and not having such keeping qualities as apples. However, there is room to increase the trade. Vicar of Winkfield, Beurre Clairgeau, and Glou Morceau are varieties well liked, and when they arrive in good condition make high prices.

London, December 16th, 1910.

Dried Fruits.—Prices in the neighborhood of 60s. per cwt. c.i.f., Hamburg, may be looked for this season for good apricots, and of course anything extra choice up to 65s. per cwt. Dried apricots must not contain more than 0.125 per cent. of sulphur. Dried apples and apple rings in good quality command up to 50s. per cwt., and extra choice 55s. per cwt., c.i.f., Hamburg. If the above prices or thereabouts are of any use to the producers, I shall be glad to have a small consignment sent to Hamburg immediately they are available. The quality and grading, however, must be right.

Meat for Germany.—The following is an extract from a letter received from the gentleman who is watching this business for me in Germany:—"We report to you further on the situation here with regard to the meat import question. The Central Government were again questioned on the subject of opening the frontiers for meat, and in reply the Imperial Chancellor said that the Government would not change their traditional policy. How a considerable part of the public regard the matter, however, may be judged by the results of the three last by-elections, i.e., two for the Reichstag and one for the Prussian Diet. Hitherto agrarian Conservatives have held all these seats, but in the elections which have taken place during the last few weeks, in one district a Socialist has been elected with the aid of the Liberals, and the other two seats have been secured by Liberal Free-traders with the assistance of the Socialists. These three elections are considered to indicate what will take place at the general election next year. The results have caused great excitement amongst the Conservative party, and also in Government circles, and there is every likelihood that in the next

elections for the Reichstag, which will take place in July, a great change in the strengths of the respective parties will be the outcome. It is therefore just at the present time that propaganda in the interests of Australian meat would be the most likely to yield good results. Before the elections come on, however, it is quite possible that the Government will give way to a certain extent if properly approached, just to take the 'wind out of the sails' of the freetraders, and if not, in any case within a reasonable time the chances are in favor of getting this market open. Austria has permitted the import of 10,000 tons of frozen meat this year, and also for next year from the Argentine, and though the German Government will only yield reluctantly, it might listen to a proposal. Therefore we are of opinion that if the matter were properly handled and brought before the right quarters it would be by no means impossible that a definite arrangement might be come to with the Government for the import of meat from one particular country, say Australia." I shall be glad to hear as early as possible if it is likely that the various States will make any move in this direction, as previously suggested by me. Germany must in the very near future be an immense market for large quantities of our produce, such as tinned meats, frozen meats, dried and tinned fruits, fresh fruits, honey, butter, cheese, and even eggs.

London, December 23rd, 1910.

Eggs.—Prices for eggs, as anticipated, are ruling very high. New-laid eggs are exceedingly short and are commanding extreme rates for the Christmas trade. This scarcity of good eggs is not without its influence on lower-priced goods, these selling with more freedom than has obtained for some considerable time. Future supplies are very limited, and should cold weather ensue even higher prices are likely to obtain. French eggs are in small supply, and very good demand at up to 2s. 3d. per dozen. Italian eggs this season are very small, but the best have made almost equivalent to the French price. Danish, from 1s. 6d. to 2s. per dozen; and Dutch are very scarce and dear, realising up to 2s. 3d. per dozen. Russian are now obtaining from 1s. to 1s. 1d. per dozen.

POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert.

POULTRY FOR EXPORT.

The season is now in full swing, and many poultry-breeders are forwarding chickens and ducklings for shipment through the Produce Department to London. Poultry destined either for the local or export markets should be sent addressed "The Manager, Light Square Branch, Produce Department, Adelaide." An advice (post card or letter) should be sent to the Manager, Adelaide, stating the number of birds and other particulars, and also if for local sale or export. All birds not up to export quality are sold locally to the best advantage. Any breed will do, if young and plump; and, as regards the cockerels, they should be without any growth of spur beyond the bud stage.

The following classes of poultry can be shipped:—

Small Chickens.—These are generally of the light breeds, principally White Leghorns, and should be plump and weigh from 2lbs. to 3lbs. live weight. They will sell well in London, and net from 1s. to 1s. 6d. each.

Chickens.—These may be of any breed, and should weigh not less than 3½lbs. live weight and upwards. They must be young. Old fowls are of no use for export, but can be sold locally with other rejects. Large chickens will sell, but the best weights are 4lbs. to 5½lbs. live weight. These, if good, will sell at about 11d. per pound in London, and the total charges amount to 7d. each.

Ducklings.—These should be of white plumage only, not exceeding 10 weeks old, and plump. Good, fat, fair weights will net about 5s. 6d. a pair in Adelaide.

Table poultry breeding is a very profitable branch of the poultry industry, and should be greatly developed. In egg production we lead all the States with our large exports, but in table-bird production we are behind Victoria and New South Wales. During recent years an excellent local market has been built up, and the consumption of table poultry is increasing rapidly. The chief increase in demand is for chickens and ducklings of prime quality, but the supply is short. The encouraging prices gained during the last five years in the London market have resulted in numerous breeders taking up this branch, and, as a result, there has been a better supply for the local

market and of better quality. The country consignments to the Adelaide market show great lack of quality. It is said in explanation that our farmers are so prosperous that they will not bother about poultry-breeding. I know numbers of farmers who keep very inferior poultry, and there are, of course, many more whose flocks I have not seen. As regards the Adelaide and export markets those living within, say, 100 miles of Adelaide are in an advantageous position. The South-East is well suited for table poultry breeding, and some splendid export specimens come from Kalangadoo and other parts.

GENERAL NOTES.

Inspectors have been appointed as follows :—For the North, Mr. W. R. Day ; and for the South and South-East, Mr. W. C. Kühne. For the Central District Mr. J. Hart is available, except during the export season. Applications for visits for inspection and advice must be addressed to the Poultry Expert, Adelaide, who will make the necessary arrangements without delay. The great number of applications for personal visits shows that the industry is expanding satisfactorily. Advice on the spot is the best method, as troubles are often due to minor details which can easily be remedied. A circular is issued monthly by the Poultry Expert, and will be sent post free to anyone desiring it. The information is seasonable, and the increasing proportions of the mailing list are gratifying. Send along your name and address if you wish to receive this and other poultry publications.

There are frequent inquiries made of me for turkeys, table poultry generally, and pullets of good laying strains. If breeders would send down particulars, business will no doubt result, and buyer and seller be placed in direct communication if desired.

A FINE POULTRY PLANT.

Mr. F. H. Heinrich, of Freeling, is erecting what will be the most modern and complete private poultry plant in Australia. The plant, which was designed by the Poultry Expert, includes the following :—Three continuous houses, each divided into 27 compartments, making in all 81 houses, each with a yard 10ft. by 40ft. back and front. The houses are of galvanized iron, painted white, and built on the scratching-shed system. In each house is a water-tap, which is very convenient. There will be manager's room and food house. The latter will contain storage bins for wheat, bran, and pollard, mixing-trough, boiler, chaffcutter, grit mill, weighing-machine, &c. A 40-ft. brooder house is divided into 14 separate compartments, in which will be flocks of chickens accommodated with separate brooders, and each having a covered inside and an outside run. Incubators will be in a specially built incubator-room, with insulated walls and roof. For testing pullets for egg production prior to use in the breeding pen a fine range of single testing

pens is provided, and a similar range of pens is for cockerels and spare male birds. The accommodation will be ample for over 1,000 laying hens, besides breeding-stock, and yards for chicken-rearing. White Leghorns only, of selected laying strains, will be kept.

Mr. C. B. Anders, of Freeling, has a small plant on good lines in course of erection. I hope others will follow these good examples. The more good poultry plants producing fine, fresh, infertile eggs the better. It is the lack of bulk of such quality that has made difficulties in the past.

DISEASE AND PREVENTION.

Nearly all the disease which causes such losses among the poultry flocks of this State could be prevented. It is generally too late when the trouble is affecting part of the flock. Insufficient attention is paid to cleaning out the yards and houses and thoroughly disinfecting them. This should be attended to frequently. Fresh, clean, drinking water, kept scrupulously shaded, should always be available. The drinking vessels should be scrubbed, scalded, and disinfected frequently. Do not feed on mouldy or smutty wheat. Such food causes great loss among poultry, and many of the diseases so caused are practically incurable. Keep a strong solution of permanganate of potash (Condy's crystals), and add enough of this to the drinking water to give it a decided color. Too much will be unpalatable to the fowls. Do not throw mash (soft food) on the ground: use clean troughs.

POULTRY TICKS.

These are particularly active just now. Readers are reminded that under the Stock Act they must destroy poultry ticks. In numerous instances this pest has been eradicated, but there are other cases where no effort has been made. The inspectors will report such cases, and steps may be taken that should not be necessary in this enlightened age.



BEESWAX.

By T. E. WHITELAW.

In the dark ages of ancient mythology beeswax occupied an important position as an article of exchange and barter, and from the very commencement of history records are found of the many ways in which beeswax can be utilised. When we realise the importance of the historical records which were handed on to future generations by means of engraved wax tablets, an insight is obtained of the work which a very small insect has assisted in a humble fashion. In the primitive ages the wax candle was the forerunner of modern methods of illumination, and at the present time a large amount of beeswax is annually absorbed for this purpose.

Up to quite recent years beeswax was commonly supposed to have been gathered by the bees from the plants they visit, and it is only latter-day discoveries which have disproved this theory.

In the year 1768 a German peasant, it is recorded, first observed the formation of thin scales of wax on the underside of the bee's body. The ventral plates beneath the abdomen possess transparent membranes, pentagonal in shape, which are covered by the lower portion of the plate above. The liquid wax is secreted by special glands which are behind these membranes, and oozes through them, forming into thin scales of wax in the pocket formed by the overlapping plate. For the successful production of this wax a high temperature—above 90° F.—is required in the hive. This explains the reason why bees are disinclined to produce wax and build comb in cold weather.

A large proportion of honey is consumed in generating wax, the amount varying according to the temperature, more honey being consumed in cold weather than in warm. The question of the exact amount of honey consumed to make 1lb. of wax is a difficult one to elucidate, and has been the cause of much discussion and experiment. Various authorities have given widely different estimates, placing the quantity at anything from 6lbs. to 20lbs. of honey per pound of beeswax. Personally, I am of the opinion that, given favorable weather, the lower estimates are nearer the mark. Huber proved that bees fed on sugar syrup could produce wax, and his experiments tended to show that more wax could be obtained from this food than from their natural food, honey.

The practical beekeeper invariably uses full sheets of wax comb foundation in the frames of his hives, enabling his bees to build comb quickly. He is aware that by supplying the wax foundations for the combs he is actually

saving a considerable amount of honey, which would otherwise be used by the bees in making wax. He saves the bees much labor, freeing a large proportion of the bee community for honey-gathering purposes. Straight worker combs are obtained which prevent, to a large extent, the rearing of useless drones—insects which have no honey-gathering proclivities.

The specific gravity of beeswax varies between .960 and .966, and its melting point is about 145° F. It is composed of about 86 per cent. of myricine and about 14 per cent. of cerotic acid, and included with the myricine will be found a fatty substance, ceroleine, usually about 4 per cent. When rendering and refining wax, care must be exercised, owing to the presence of this cerotic acid. Hard water, containing lime, should on no account be used, for the cerotic acid of beeswax will combine and form an insoluble lime soap, and a waste of wax is the consequence. Should wax be boiled in water of this nature there will be found beneath the wax cake, when it is cold, a greyish spongy matter, which is this lime soap. Rain or distilled water is always used for the best results, but the addition of an acid to hard water will render it fit for use, as the acid will unite with the lime and prevent it from combining with the cerotic acid. Sulphuric, hydrochloric, and nitric acids, and even common vinegar, will serve the purpose; but the first-named acids should be used with care, as they are dangerous chemicals. The addition of an acid—usually sulphuric—assists to improve the color of the wax, the proportion depending on the quantity and color of the wax that is rendered. If the wax is dark the amount of acid used is half a pint to each 120lbs. wax, the quantity of water varying according to the receptacle, but it should be about 5galls. to 6galls.

The vessels used for rendering and refining wax require careful selection, as their composition often has a marked effect on the color of the wax. Iron vessels will impart a reddish tint to the wax owing to the oxidation of the iron, but if they are first rubbed with fat while they are warm the subsequent refining will not be affected. An ideal melting-vat is a copper one, well tinned over, or better still, an enamelled iron vessel. A wooden tank can also be used if steam is available to melt the wax. Nitric acid cannot be used with tinned vessels, as the acid will act on the tin. The melting of beeswax is always proceeded with at the lowest possible temperature consistent with efficiency, as a far better color is obtained.

The finest wax is that produced from the "uncappings" during the process of honey extraction, and these are always preserved and kept from the other wax which is produced in the apiary, and are rendered separately, needing very little treatment owing to the absence of dirt. Very few beekeepers care for the task of rendering old combs, for even under the best of conditions it is somewhat of a messy job. The older the combs the smaller the amount of wax they yield, and examination reveals that an old comb is practically built up of innumerable silken cocoons which line every brood cell, one on

top of another, having been thrown off by the larvæ which have occupied the cells in the process of incubation. By breaking and soaking such combs in rainwater for 24 hours previous to rendering, these cocoons will absorb moisture, and during the process of rendering will not absorb the molten wax. At the same time a large quantity of discoloring matter is washed out which would serve to darken the wax during the melting.

One method of extracting the wax from old combs is to boil them with water in a suitable receptacle, and when the wax is all melted it is dipped off the top, where it floats, and is strained into suitable moulds. This has the disadvantage that a quantity of wax remains in the debris which can only be removed by means of pressure. By encasing the combs in stout canvas bags the wax will boil through the bag, leaving the debris within, and by means of a flat board on a pole, pressure can be brought on the bag of refuse, pressing out the remaining wax.

The advancement of beekeeping in recent years has, however, brought improved appliances for the rendering of wax. The Solar wax extractor is a useful adjunct to every apiary; the heat of the sun shining through glass melts the combs placed within the extractor, the wax, running through a sieve, is cleaned and can be withdrawn when cold. For dealing with large quantities of wax it is little good, but as a handy means of disposing of the stray pieces of combs which are gathered up during the day's work in the apiary, it cannot be excelled.

For commercial purposes combs should be rendered under steam pressure, this being a very efficient way to melt large quantities quickly, the chief drawback being that the process is conducted at a high temperature, which is inclined to affect the quality and color of the wax. The pressure used should not be continuous, but should be relaxed at intervals to allow the steam to percolate the debris. The German steam press has proved itself an efficient apparatus. It consists of a cylinder containing a perforated metal basket, having a plunger within it actuated by means of a screw at the top. The combs, wrapped in canvas, are placed in the basket, and steam from a false bottom rises and melts the combs, and the wax runs down on to the top of the false bottom and passes through an outlet into suitable moulds.

The value of wax for market depends on several factors, among which we find the question of purity an important one. The high value of beeswax compared with other waxes renders it liable to sophistication, and much of the product which finds its way to the market has been adulterated with waxes having a vegetable origin. For manufacturing purposes the bleaching characteristics are important, as a wax which bleaches quickly and readily is distinctly preferred. The dark wax from Guadeloupe is almost unbleachable and has a low value in consequence. The wax from Turkey, which has a bright orange-red tint, occupies a high position as a marketable wax. The

color of the wax is largely derived from the nature of the pollen contained in the honey used, and yellow is found to be the predominant color.

Much of the wax that arrives at the London and Liverpool markets in a rough state in bags is of vegetable origin and contains a large amount of impurities. This wax is commonly referred to as "Colonial" or "Foreign" wax, as the case may be; and it is important when exporting to these trading centres that beeswax should be carefully prepared and clearly designated as pure, so that it is in no way classified with the rubbish which finds its way to these markets under the name of wax. Large cakes should be avoided, as the buyer has a difficulty in making sure it is wax right through; for cases have been known in which a supposed block of wax was composed chiefly of nails.

USES FOR BEESWAX.

Horses, Cracked Hoofs.—Wax and honey in equal parts are melted over a slow fire; the hoof is thoroughly cleaned with tepid water and the above mixture is well rubbed in with a brush. Several applications will cause the cracks to disappear and the hoof will regain its softness.

Farm Harness Preservative.—Mix 1½ lbs. each yellow beeswax, oil of turpentine, and castor oil with 12½ lbs. linseed oil and 1½ lbs. tar—the whole to be thoroughly mixed. By occasional application harness is protected from the influence of heat, perspiration, and moisture.

Harness Blacking.—Mutton suet, 2ozs.; beeswax, 6ozs. Melt, and add sugar candy, 6ozs.; soft soap, 2ozs.; lampblack, 2½ozs.; and finely-powdered indigo, ½oz.; when well mixed add oil of turpentine, ¼ pint.

Waterproofing Boots and Shoes.—Beeswax, 1oz.; suet, ½oz.; olive oil, 2ozs.; lampblack, ½oz. Melt the wax and suet in oil, add lampblack, and stir till cool. Warm boots before applying.

Furniture Pastes.—No. 1.—Beeswax, spirits of turpentine, and linseed oil, in equal parts. Melt and cool.

No. 2.—Beeswax, 1lb.; soap, ¼lb.; pearlash, 3ozs. Melt in ½gall.; strain and boil to the proper consistency



FRUIT AND PLANTS.

ADMISSION OF TOMATOES INTO VICTORIA.

In consequence of the Victorian regulations made in relation to the Irish blight, the fruit and produce merchants of Adelaide who make a practice of forwarding their goods to the Wimmera district in Victoria have been placed at a disadvantage, owing to such regulations requiring that tomatoes to secure admission shall not be grown in or conveyed through an area where the Irish blight disease exists. A few weeks ago representations were made to the Victorian Government by the South Australian Department of Agriculture, pointing out that the tomatoes grown under special conditions here were quite free from Irish blight, and they were not likely to become contaminated while being conveyed by rail through the areas wherein potato blight may be found, and asking that the tomatoes should be admitted to Victoria under the usual methods of inspection. A letter has now been received from the Secretary of the Victorian Department of Agriculture intimating that the Minister had approved of relaxing that portion of the vegetation diseases regulations. The packers and merchants of this State will now be able to forward their tomatoes freely into Victoria on condition they pass the usual inspection prior to export and be accompanied by the necessary certificate.

REGULATIONS UNDER THE COMMERCE ACT.

The following amendments in the regulations under the Commerce Act, in relation to the export of fruit plants and fruit products, have been made, and came into operation on February 1st, 1911 :—

Trade Description.

This is to be stamped on each package or case as heretofore, but the terms " sound " or " unsound " are not to be used on packages of fresh fruit, nor in declarations or " notices of intention to ship " the same. Wherever fresh fruit is well graded, of good quality and size, and undamaged by bruising, disease, &c., no reference to its condition need be included in the trade description. Where such cannot be claimed, one of the following terms, which may meet the case, must be substituted :—

" Unsorted Fruit."

Where the package contains fruits of various sizes the trade description shall include the word " unsorted."

Small Apples.

Wherever apples are under 2½ in. in diameter the trade description shall include in bold and legible characters the words " Under 2½ in."

Prohibitions.

Wherever fresh fruit is of an inferior, unsound, or abnormal condition, its export is prohibited unless the trade description includes in bold and legible characters the words, "Second grade," and when in a similar state or condition dried and preserved fruits, jam, maize, plants, potatoes, and seeds must be branded "Unsound" or "Inferior," as the case demands.

Honey.

If honey contains any foreign matter, or is unripe, each package must be branded "Below standard."

REGULATIONS AGAINST RED SCALE AND CODLIN MOTH.

The following regulations under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910 for the destruction of orange red scale and codlin moth were issued on February 2nd, 1911.—

Regulations under the Vine, Fruit, and Vegetable Protection Acts, 1885 and 1910, for the Destruction of Orange Red Scale.

1. In these regulations the word "inspector" means any inspector appointed under the Vine, Fruit, and Vegetable Protection Act, 1885, and includes the Chief Inspector.

2. Whenever an inspector is of opinion that a tree or plant is affected by the insect known as *Aspidiotus aurantii* of Maskell (or orange red scale) he may serve upon the occupier of the land where such tree or plant is found, or if the land is unoccupied, then upon the owner thereof, a notice signed by him as such inspector, directing that within a period of time stated in such notice the said occupier or owner shall take any or all of the following steps for the destruction of the said insect:—

- i. Every affected tree shall be enclosed within a gastight cover approved by an inspector, and every such tree shall be fumigated with hydrocyanic acid gas generated within the space occupied by the tree enclosed.
- ii. The ingredients used shall be potassium cyanide, sulphuric acid, and water, each of such proportions and quality and mixed in such a manner as the inspector shall direct.
- iii. Each such affected tree shall be subjected to the hydrocyanic acid gas within the closed cover for such period as the inspector may determine.
- iv. Every tree affected by the red scale shall, to the satisfaction of the inspector, be sprayed with an insecticide of such composition and strength as such inspector may prescribe.

Regulations under the Vine, Fruit, and Vegetable Protection Acts, 1885 and 1910, for the Destruction of Codlin Moth.

1. In these regulations the word "inspector" means any inspector appointed under the Vine, Fruit, and Vegetable Protection Act, 1885, and includes the Chief Inspector.

2. Whenever an inspector is of opinion that a tree or plant is affected by the insect known as *Carpocapsa pomonella* of Linneus (or codlin moth) he may, by notice signed by him, direct the occupier of the land where such tree or plant is found, or if the land is unoccupied, then upon the owner thereof, to take any or all of the following steps within such periods of time as the inspector shall state in such notice:—

- I. Scrape off all dead bark from the trunks and limbs and clean out all crevices of any trees which may prove a shelter for the said insect. All such scrapings shall be destroyed to the satisfaction of the inspector.
- II. Fasten such band as shall be deemed by the inspector to be an effective shelter for the larva of codlin moth firmly around the trunk or limbs of every such tree as the inspector deems necessary.
- III. From time to time remove and examine every such band, destroy all codlin moth found beneath, and replace the said band around the trunk or limbs.
- IV. Remove every object which, in the opinion of an inspector, may provide a shelter for the codlin moth to such a distance from any tree as the inspector may determine.
- V. Collect all fruit affected by codlin moth, whether found upon any tree or on the ground, and treat same in such manner as an inspector may direct.
- VI. Spray any tree, or every tree of such kinds as an inspector may name in any notice, at such intervals and with a compound of such strength and nature as an inspector may prescribe, and such spraying shall be to the satisfaction of such inspector.

By way of explanation of the above regulations, it may be pointed out that inspectors under the Vine, Fruit, and Vegetable Protection Act of 1885 were compelled to report the discovery of any insect or pest to the Commissioner of Crown Lands, recommend the treatment they deemed necessary, secure the Commissioner's authority, and then direct the person in occupation to carry out these precautions. This was a roundabout, time-consuming process, which often permitted a season to pass before anything could be done. Under the Vine, Fruit, and Vegetable Protection Act Amendment Act of 1910 this practice has been discontinued, and inspectors are authorised on the finding of any disease or insect for which regulations have been proclaimed to serve notice immediately on the occupier or owner, and insist on the necessary steps being taken within a given time.

Although these codes of regulations for red scale and codlin moth appear fairly formidable, it does not by any means follow that the owners of infested trees will be compelled to carry all of them into effect. For instance, when the owner of orange trees has fumigated them, he is not likely to be called upon to apply any spray wash to them, but the inspector has been empowered to direct spraying to be done to meet emergencies where it is not possible to have the fumigation performed within a desirable time. By this means the pest may be kept down and prevented from spreading over gardens which have been fumigated.

† In respect to the regulations dealing with codlin moth, although practically all the precautions that have been found of any value have been incorporated into the list of regulations, there is no likelihood of owners of apple orchards being compelled to put them all into operation. The incorporation of so many precautionary measures in the regulations gives the inspector an opportunity, when he finds this pest, to prescribe something which may meet the immediate condition of the crop or insect. There is very little doubt but when these regulations are got into working order they will result in more prompt action being taken against the various pests.

PROHIBITION OF REMOVAL OF CERTAIN FRUITS FROM VALLEY OF THE MURRAY.

The following regulations, prohibiting the removal of apples, pears, and quinces *excepting* under the conditions stated, into the valley of the Murray from Morgan to the borders of Victoria and New South Wales, have been made :—

1. Prohibit, subject to the restrictions prescribed in paragraph 2 hereof, the removal from any other part of the State into that part of the State being that portion of the Murray Valley from Morgan to the borders of the States of New South Wales and Victoria, including all the irrigable areas and extending from the centre of the River Murray for a distance of 25 miles on either side, of the fruit of apples, pears, and quinces.

2. Declare that no fruit of apples, pears, or quinces shall be removed from any part of the State into that other part of the State described in paragraph 1 hereof, unless (a) each consignment is accompanied by a certificate signed by an inspector under the above-mentioned Acts stating the destination of such fruit and declaring that it has been examined by him and is in his opinion free from codlin moth and all other injurious insects or diseases, (b) the cases or packages containing the fruit are new, (c) such fruit on arrival at its destination, before being delivered to the consignee, is again examined by an inspector under the above-mentioned Acts.

The object of this prohibition is to prevent for as long a time as possible the codlin moth from obtaining a lodgment in the young pear orchards which are now springing up on the various irrigation settlements along the valley of the Murray. Suitable persons at the various settlements have been

approached with a view of obtaining their assistance in carrying out the requirements of this proclamation, and while the Department of Agriculture is endeavoring to do all it can to protect the property of the settlers, it is to be hoped that those interested will assist the department in its attempts to keep their plantations free of this serious pest.

REGULATIONS AS TO THE INTRODUCTION OF TREES, FRUIT, AND PLANTS.

The following proclamation by the Governor in Executive Council gives in a compact form the regulations in force at present with respect to the introduction of trees, fruits, and plants into this State :—

By virtue of the provisions of the Vine, Fruit, and Vegetable Protection Acts, 1885 and 1910, I, the said Governor, with the advice and consent of the Executive Council of the said State, do hereby

1. Revoke the proclamation dated the 1st day of June, 1910, and published in the *Government Gazette* on the 2nd day of June, 1910, making regulations for carrying into effect the provisions of the above-mentioned Acts, and for the destruction in South Australia of insects and the eradication of diseases.

2. Prohibit absolutely the introduction into South Australia from any State or territory of the Commonwealth of Australia of any grape vine or any portion thereof.

3. Prohibit absolutely the introduction into South Australia of potatoes or other solanaceous plants from any district in any State or territory in the said Commonwealth in which the Irish blight fungus (*Phytophthora infestans* of De Bary) exists.

4. Prohibit the introduction into South Australia from any State or territory of the Commonwealth of Australia of any living tree or plant and any portion thereof, except under and subject to the regulations in the schedule hereto.

5. Make the regulations set out in the schedule hereto for carrying into effect the provisions of the above-mentioned Acts, and for the destruction in South Australia of insects and the eradication of diseases.

6. Direct that this proclamation shall be in force from and after the publication thereof in the *Government Gazette*.

THE SCHEDULE.

Regulations relating to the Introduction of Trees, Plants, and Fruits into South Australia.

1. Living trees, plants, or portions thereof (not being grape vines or portions thereof), and fruits (not being grapes) may be introduced into South Australia from any State or territory of the Commonwealth of Australia under and subject to these regulations, but not otherwise.

2. Living trees, plants, or portions thereof, and fruits, the introduction of which is not herein prohibited, may be introduced only through the port of

Port Adelaide, by parcels post at Adelaide, by railway at Serviceton, and by wharf at Renmark.

3. No fruit or other product of any tree or plant shall be landed on any wharf, jetty, or other structure in South Australia without the written permission of an inspector first obtained.

4. All living trees, plants, or portions thereof intended for introduction into South Australia must, prior to being landed or introduced, be thoroughly cleansed of soil: Provided always that any inspector may admit any tree or plant growing in a pot or other receptacle if in his opinion there is no danger in importing the same.

5. Every case, package, bunch, or bundle containing or consisting of any living tree, plant, or portion thereof, or fruit introduced into South Australia from any other State or territory of the Commonwealth of Australia shall—

(a) Be accompanied by a certificate signed by an officer of the Department of Agriculture of the exporting State, stating that such tree, plant, or portion thereof, or fruit has been examined by him and found to be reasonably free from disease and fit for export, and that the packages containing the same are new:

(b) Have indelibly and legibly printed, marked, or stencilled upon it, or upon a label or tag attached thereto, the grower's or exporter's name and address, or his registered mark or brand in letters or figures of not less than one half-inch in length.

6. In addition to the conditions set out in the preceding regulation no potatoes or other solanaceous plants, or portions thereof, shall be introduced into the State of South Australia from any State or territory of the Commonwealth of Australia unless—

(a) The Government of the exporting State or territory has supplied to the Minister of Agriculture of the State of South Australia a map in which its whole area is clearly divided into districts, to each of which a number is assigned, and each district in which the Irish blight fungus (*Phytophthora infestans* of De Bary) exists is distinctly indicated on the said map:

(b) Every certificate issued by an officer of the Department of Agriculture of the exporting State or territory which shall accompany any consignment shall indicate by legibly printed name or number the district wherein such potatoes or other solanaceous plants were grown, as well as contain a declaration made by the said inspector that the potatoes or other solanaceous plants are, to the best of his knowledge, free from Irish blight fungus:

(c) Each bag, box, or other receptacle in which any potatoes or other solanaceous plants are brought for introduction into South Australia must be branded with a legible name or number indicating the district and State in which such potatoes or other solanaceous

plants were grown, and such names or numbers shall correspond with names or numbers on the map supplied by the exporting State.

7. All living trees or plants, or portions thereof, or fruits introduced into South Australia from any State or territory of the Commonwealth of Australia shall, on being landed or introduced, be forthwith delivered into the custody of some inspector under these Acts, or some officer of Customs, and shall, at the expense of the importer or consignee thereof, be conveyed in original unopened packages to such place in such manner as the Commissioner shall direct.

8. An inspector shall examine all trees, plants, or portions thereof, or fruits, and may treat such trees, plants, or portions thereof, or fruits in such manner as he may think desirable, or may order that such trees or plants, or portions thereof, or fruits and the cases or packages in which they were packed, or either of them, shall be destroyed if, in his opinion, there is any danger in importing them.

9. The expense of conveying such trees, plants, or portions thereof, or fruits to the place fixed for their examination, and of the examination and treatment or destruction thereof, shall be borne by the consignee or introducer thereof, and shall be paid before they are delivered to such consignee or introducer.

10. No charge for examining such trees, plants, or portions thereof, or fruits shall exceed 1d. per case, package, bunch, or bundle when it does not exceed the cubic capacity of two imperial bushels. For sorting or disinfecting the same not more than 3d. shall be charged for every such case, package, bunch, or bundle when it does not exceed the cubic capacity of two imperial bushels.

11. No person shall be entitled to any compensation by reason of any damage to or by the destruction of any tree, plant, portion thereof, or fruits, or of any case or package under these regulations.

12. No plant or portion thereof shall be introduced into South Australia from any State or territory of the Commonwealth of Australia where the insect known as *Phylloxera vastatrix* is known to exist unless accompanied by a declaration made by the grower before a justice of the peace or officer of the Department of Agriculture in the State or territory of origin to the following effect :—

- (a) That the plants were grown at a greater distance than 50yds. from any grape vines or roots of vines ;
- (b) That no phylloxera exists or has existed in the nursery or garden in which the plants have been growing.

Any person contravening the provisions of the above regulations, or any of them, will be liable to a penalty of not less than £5 nor more than £100, or to imprisonment for any period not exceeding six months.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the above Board was held on Wednesday, January 11th, 1911, there being present Messrs. Chas. Willcox (in chair), G. R. Laffer, C. J. Valentine, Col. Rowell, J. Miller, C. J. Tuckwell, W. J. Colebatch, and Geo. Jeffrey.

Approval was given to the formation of a Branch at Yadnarie, with the following gentlemen as members :—Messrs. J. J. Deer, L. H. Marston, J. A. Kruger, G. A. Dreckow, T. C. Dreckow, C. Dreckow, H. Weiss, J. H. Stubins, F. W. Jericho, A. Jericho, C. B. Schubert, W. F. Sims, E. Kruger, J. Dreckow, A. Spriggs, F. H. Gillings, C. W. Mowat, W. Brown, F. Dreckow, R. B. Deer.

The resolutions from Annual Congress, urging that the veterinary examination of stallions should be extended so as to prevent the introduction of unsound stallions, and, further, that it should apply locally to all stallions offered for public use, were discussed. Mr. Colebatch pointed out that the latter resolution would make veterinary examination applicable to racehorses, and would probably cause a good deal of opposition. After some discussion it was resolved that a copy of the resolution be sent to each member, in order to come to some decision at the next meeting.

The Secretary read resolution from Belalie North in respect to the crowding at Roseworthy College on Farmers' Day ; this had also been referred to by other Branches. Mr. Colebatch pointed out that they did not possess at the college the facilities for giving between 400 and 500 people a meal, and so long as all the visitors wanted their lunch at the same time it was impossible to avoid some overcrowding. Members suggested that steps should be taken to limit the number of visitors, or a special charge be made for lunch and arrangements made with a caterer to erect marquees to accommodate the visitors. It was decided to let the matter stand over until return of Professor Perkins.

Some discussion took place in reference to the quarantine grounds for imported stock, and it was resolved—"That owing to reports received concerning the accommodation at the Stock Quarantine Station, the Hon. Minister of Agriculture be asked to arrange for an inspection by the Board." Mr. Colebatch pointed out that the quarantine regulations necessitated valuable stock imported from abroad being kept at the quarantine station for considerable periods, and it was essential that proper facilities should be provided for the care of these animals. There was room for considerable improvement in certain directions, and in the interests of stockowners he thought the Commonwealth authorities should be requested to give attention to the matter.

The following gentlemen were approved as members of the undermentioned Branches :—Messrs. E. A. Basley, Morchard ; D. Clark, Hartley ; W. Jackson, Clarendon ; H. G. Hastings, Wirrabara ; and R. Lampie, Tatiara.

THE WHEAT MARKET.

The Australian wheat markets during January were governed entirely by London, where the market has shown an easier tendency, due to the fact that while there is a large demand for wheat in all importing countries, there is a still larger supply. Up to December 9th *Beerbohm* estimated that 5,000,000 quarters had been received more than was required, leading to an increase of stocks, which has to some extent affected subsequent operations. The easier tendency in London has been reflected in the Australian quotations, the price in Adelaide falling from 3s. 7½d. on the 16th January to 3s. 4½d. on the 8th February. The markets in the other States have shown a similar decline, but the quotations there have been on the average a halfpenny better than in Adelaide. In estimating the world's requirements and the probable shipments, *Beerbohm* concludes that there is apparently an excess of 1,500,000bush.; consequently no great improvement in the price can be expected in Australian markets unless there should be a big decrease in freights.

In its issue of January 6th the same paper says --

With reference to future shipments, it is probable that Russia has quite as much wheat still to ship as at this time last year; Roumania and India each several million quarters more than in 1910; Canada considerably less, but America, in view of the very small exports, and the larger reserves brought forward from the 1909 crop, probably holds more wheat than a year ago, although not at all willing to part with it at present prices.

The actual yield of the Argentina crop is still unknown, but in some districts good crops have been harvested, as proved by the heavy weight of the wheat on offer. Even with a surplus of only 10,000,000 to 11,000,000 quarters good shipments must be expected between now and April, and the same remark applies to Australia.

Under all the circumstances a moderate level of prices, such as the present one, ought to draw sufficient wheat to satisfy requirements up to the time when some idea can be formed as to the probable outturn of the winter wheat crops of America and Europe. With the exception of Russia, present conditions are not so favorable as at this time last year, although there has been a general, even if only moderate, improvement in prospects compared with a month ago. In the United States conditions are distinctly less favorable than last year, and the outlook is a very uncertain one. The area sown was very large, and with favorable weather in the future a good yield may still be reaped, but a really severe winter, without a good snow cover, would do more damage than usual. In India, with good rains in the principal districts this week, prospects for a large yield continue very favorable.

With respect to the Argentine crop *Broomhall* writes on January 3rd—

Our own agent in Buenos Ayres, in whose good faith our readers may repose absolute confidence, recommends us to reduce our original estimate, made at the beginning of the harvest, by 250,000 tons, which would leave it at 12,600,000 quarters and although the figures seem to the writer, who recently inspected a considerable portion of the Argentine wheat area, to be on the small side, yet we do not feel like disregarding our agent's advice. An exportable surplus of only 12,600,000 quarters predicates a total crop of 19,500,000 quarters, allowing for 1,500,000 tons to be retained in the Republic for bread and seed. On the officially returned area of 15,445,000 acres a crop of 19,500,000 quarters predicates an average yield per acre of only a bare 10bush., or if it be allowed that two and a half million acres did not bear any crop, the plant having been killed outright by drought, the yield per acre would work out at only 12bush.

Date.	LONDON (Previous Day).		ADELAIDE.		MELBOURNE.		SYDNEY.	
	Per Bushel.		Per Bushel.		Per Bushel.		Per Bushel.	
Jan. 6	Dull, with easier tendency	3/7½	..	3/7½ to 3/8	..	3/7½ to 3/8½	..	3/7½ to 3/8½
7	Steadily held; inactive	Do.	..	Do.	..	..	..	..
9	—	3/7	..	3/7½	..	..	..	3/7½ b.; 3/7½ to 3/8 s.
10	Quiet, with easier tendency	Do.	..	Do.	..	..	..	3/7 to 3/7½ b.; 3/7½ s.
11	Jan.-Feb. 4/6½	Do.	..	3/7½	..	..	..	3/7 to 3/7½ b.
12	Quiet	3/6½ to 3/7	..	3/7 to 3/7½	..	..	Do.	..
13	Jan.-Feb. 4/6½	3/7	..	Do.	..	..	3/7 to 3/7½ b.; 3/7½ s.	..
14	Do.	Do.	..	3/7 to 3/7½	..	..	..	..
16	—	Do.	..	3/7½ to 3/7½	..	..	..	3/7 to 3/7½ b.; 3/7½ to 3/8 s
17	Dull, with easier tendency	Do.	..	3/7½ to 3/7½	..	..	..	3/7 to 3/7½
18	Quiet, with easier tendency	Do.	..	3/7 to 3/7½	..	..	..	3/7½ to 3/7½ s. (parc.)
19	Steady; quiet	Do.	..	3/7	..	..	..	3/7 b.
20	Dull and neglected	Do.	..	Do.	..	..	..	3/6½ to 3/7
21	Nov.-Dec. 4/6½	3/6½	..	3/6½ to 3/7	..	..	..	..
23	—	Do.	..	3/6½	..	..	..	3/6½ to 3/6½ (parc.)
24	Very dull	Do.	..	3/7 to 3/7½ (parc.)	..	..	..	3/6½ b.; 3/7 s.
25	Steady	Do.	..	3/6½ b.	..	..	..	3/6½
26	Jan.-Feb. 4/6	3/6	..	3/6½; 3/7 (parc.)	..	..	..	3/6½ b.; 3/6½
27	Dull, with easier tendency	Do.	..	3/6½; 3/6½ to 3/7 (parc.)	..	..	..	3/6½ b.; 3/6½ to 3/7 s.
28	Do.	3/5½	..	3/6½ to 3/6½	..	..	..	..
30	—	Do.	..	3/6 b.; 3/6½ to 3/6½ s.	..	..	..	3/6 b.
31	Dull, with easier tendency	Do.	..	3/6½ ex. store; 3/6	..	..	..	3/6
Feb. 1	Dull; offered lower	3/5	..	3/5½ to 3/6	..	..	..	3/5½ and 3/5 b.
2	Steadier; inactive	Do.	..	3/5½	..	..	..	3/5½
3	Jan.-Feb. 4/4½	Do.	..	3/5 to 3/6	..	..	..	..
4	Feb.-March 4/4½	Do.	..	3/6 ex. store	..	..	..	3/5½
6	—	Do.	..	3/5½	..	..	..	Do.
7	Jan.-Feb. 4/4½	Do.	..	Do.	..	..	..	Do.
8	Quiet	3/4½	..	Do.	..	..	..	3/5 to 3/5½ b.

STEAMER FREIGHTS.—Parcels, Adelaide to London or Liverpool, 22s. 6d. per ton (7½d. per bush.); Continental ports, 25s. per ton (8d. per bush.). Full cargoes United Kingdom-Continent, 26s. 3d. to 27s. 6d. per ton (8½d. to 8½d. per bush.), according to loading date. Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—Full cargoes for prompt sailers, 26s. 3d. per ton (8½d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for January, 1911, at the undermentioned stations, also the average rainfall for January, and the fall for January, 1910:—

Station.	For Jan., 1911.	A'v'ge. for Jan	For Jan., 1910	Station.	For Jan., 1911.	A'v'ge. for Jan.	For Jan., 1910.
Adelaide	0-17	0-85	0-02	Hamley Bridge	0-20	0-97	0-35
Hawker	0-16	0-58	0-14	Kapunda	0-23	0-91	0-70
Craddock	0-68	0-65	—	Freeling	0-10	0-93	0-47
Wilson	0-08	0-71	0-49	Stockwell	0-25	0-84	0-73
Gordon	1-07	0-29	0-55	Nuriootpa	0-27	0-89	0-49
Quorn	0-32	0-65	0-47	Angaston	0-25	0-84	1-08
Port Augusta	0-27	0-55	0-81	Tanunda	0-56	0-91	0-58
Port Germein	0-31	0-73	0-13	Lyndoch	0-07	0-91	0-62
Port Pirie	0-18	0-83	0-28	Mallala	0-10	0-98	0-11
Crystal Brook	0-02	0-70	1-24	Roseworthy	0-02	0-87	2-20
Port Broughton	1-65	0-27	0-12	Gawler	0-05	0-79	0-82
Buté	0-22	0-83	0-33	Smithfield	0-07	0-77	0-13
Hammond	—	0-70	1-29	Two Wells	0-03	0-90	0-02
Bruce	0-32	0-27	0-88	Virginia	0-06	0-91	—
Wilmington	2-82	0-83	0-66	Salisbury	0-03	0-85	0-51
Melrose	2-56	1-33	0-88	Teatree Gully	0-12	1-14	0-10
Booleroo Centre	0-02	0-90	1-08	Magill	0-38	1-04	0-04
Wirrabara	0-02	0-68	0-55	Mitcham	0-15	1-01	0-05
Appila	0-11	0-67	0-88	Crafers	0-64	1-79	0-24
Laura	0-10	0-71	2-00	Clarendon	0-33	1-31	0-07
Caltowie	—	0-70	0-93	Morphett Vale	0-19	1-06	0-05
Jamestown	0-09	0-69	0-35	Noarlunga	0-04	0-76	0-05
Gladstone	1-02	0-66	0-75	Willunga	0-03	0-86	0-09
Georgetown	0-05	0-71	0-27	Aldinga	0-19	0-77	0-05
Narridy	0-02	0-66	0-36	Normanville	0-02	0-67	—
Redhill	0-02	0-60	0-04	Yankahilla	0-05	0-71	—
Koolunga	0-03	0-69	0-17	Eudunda	0-41	0-88	2-00
Carrieton	0-03	0-74	4-33	Sutherlands	0-15	—	0-55
Eurelia	—	0-74	2-66	Truro	0-23	0-82	0-33
Johnsburg	—	0-52	1-34	Palmer	0-34	—	0-31
Orroroo	—	1-13	0-97	Mount Pleasant	0-24	0-89	0-31
Black Rock	—	0-71	1-24	Blumberg	0-33	1-37	0-70
Petersburg	0-04	0-80	1-26	Gumeracha	0-36	1-18	0-93
Yongala	0-02	0-69	0-53	Lobethal	0-34	1-22	0-38
Terowie	0-34	0-74	1-33	Woodside	0-24	1-18	0-44
Yarcowie	0-34	0-61	4-10	Hahndorf	0-38	1-26	0-64
Hallett	0-46	0-80	1-19	Nairne	0-51	1-20	0-20
Mount Bryan	0-67	0-34	1-75	Mount Barker	0-52	1-12	0-83
Burra	0-93	0-80	1-33	Echunga	0-40	1-28	0-16
Snowtown	0-06	0-76	—	Macclesfield	0-56	1-12	0-25
Brinkworth	0-06	0-47	0-13	Meadows	0-27	1-35	0-33
Blyth	—	0-79	0-03	Strathalbyn	0-16	0-79	0-24
Clare	0-18	0-97	0-11	Callington	0-43	0-93	0-08
Mintaro Central	0-55	0-65	0-11	Langhorne's Bridge ..	0-21	0-59	0-22
Watervale	0-26	1-03	0-32	Milang	0-13	0-84	0-12
Auburn	0-23	1-12	0-68	Walleroo	0-04	0-64	0-10
Manoora	0-11	0-63	1-23	Kadina	0-03	0-61	0-12
Hoyleton	0-10	0-94	—	Moonta	0-80	0-60	0-12
Balaklava	0-02	0-86	0-03	Green's Plains	0-04	0-67	—
Port Wakefield	0-38	0-65	0-26	Maitland	0-86	0-68	—
Saddleworth	0-15	0-86	1-11	Ardrossan	0-26	0-61	—
Marrabel	0-18	0-86	0-11	Port Victoria	0-59	0-53	0-01
Riverton	0-29	0-80	0-87	Curramulka	0-01	0-78	0-01
Tarlee	0-09	0-89	0-81	Minlaton	—	0-58	—
Stockport	0-17	0-96	0-21	Stansbury	0-12	0-75	0-02

RAINFALL TABLE—*continued*

Station.	For Jan., 1911.	A'v'ge. for Jan.	For Jan., 1910.	Station.	For Jan., 1911.	A'v'ge. for Jan.	For Jan., 1910.
Warooka	0-10	0-51	0-08	Bordertown	0-18	0-94	0-07
Yorke town	0-02	0-59	0-12	Wolseley	0-15	0-75	0-16
Edithburgh	—	0-58	0-60	Frances	0-12	0-91	0-22
Fowler's Bay	0-21	0-49	0-15	Naracoorte	0-48	0-92	0-10
Streaky Bay	—	0-54	—	Lucindale	0-08	0-89	—
Port Elliot	—	0-47	0-05	Penola	0-63	1-18	0-71
Port Lincoln	0-05	0-69	0-05	Millicent	—	1-14	0-52
Cowell	0-23	0-51	—	Mount Gambier ...	0-20	1-58	1-08
Queenscliffe	—	0-52	—	Wellington	0-46	0-98	—
Port Elliot	0-07	0-78	0-11	Murray Bridge	0-17	0-81	0-07
Goolwa	0-22	0-74	0-09	Mannum	0-14	0-55	0-33
Meningie	0-41	0-75	0-05	Morgan	0-06	0-57	0-45
Kingston	—	0-87	—	Overland Corner ..	1-01	0-59	0-55
Robe	—	0-88	0-01	Renmark	0-77	0-53	0-65
Beachport	—	1-13	0-29	Lameroo	0-83	—	0-07
Coonalpyn	0-24	0-86	0-20				

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on February 1st:—

BUTTER.

The mild weather has caused the supply of cream to be more plentiful than usual at this period of the year, but there is not so much available for superfine and pure creamery butters. The high standard of the butter has been well sustained, and the demand large. There has been a rise in price during the month, the present prices being:—Superfine, 1s. $\frac{1}{4}$ d. per lb.; pure creamery, 11 $\frac{1}{4}$ d. per lb.

Messrs. A. W. Sandford & Co. report on February 1st:—

POTATOES.—New locals, £5 to £6, Adelaide, per ton of 2,240lbs.

ONIONS.—New locals, £3 10s. to £4 10s. on trucks, Adelaide, per ton of 2,240lbs.

BUTTER.—Factory and creamery, fresh in prints, 11d. to 1s. 0 $\frac{1}{2}$ d.; second grade factories, 9d. to 10d.; choice separators, dairies, 9 $\frac{1}{2}$ d. to 10 $\frac{1}{2}$ d.; weather-affected lots, 7d. to 8d.; well-conditioned stores and collectors', 7d. to 7 $\frac{1}{2}$ d.; heated lines down to 6d.

CHEESE.—Factory makes, new season's, for large to loaf, 4 $\frac{1}{2}$ d. to 5d. per lb.

BACON.—Factory-cured sides, 7d. per lb.

HAMS.—In calico, 9d. to 9 $\frac{1}{2}$ d. per lb.

EGGS.—New-laid, 8 $\frac{1}{2}$ d. per dozen, for prime, guaranteed hen.

LARD.—Skins, 6 $\frac{1}{2}$ d.; tins or bulk cases, 6 $\frac{1}{2}$ d.

HONEY.—Prime clear extracted, new season's, 2 $\frac{3}{4}$ d.; second grades dull at 1d. to 1 $\frac{1}{2}$ d.; beeswax, 1s. 2d. per lb.

ALMONDS.—(Scarce) Softshells, Brandis, 7d.; mixed softshells, 6 $\frac{1}{2}$ d.; kernels, 1s. 3 $\frac{1}{2}$ d. per lb.

LIVE POULTRY.—Good table roosters, 3s. to 3s. 6d. each; plump cockerels, 2s. 6d. to 3s.; hens and light cockerels, 1s. 6d. to 2s.; ducks, 2s. to 3s.; geese, 3s. 6d. to 4s. 6d.; pigeons, 7d.; turkeys, 8d. to 9 $\frac{1}{2}$ d. per lb., live weight, for fair to good table birds.

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Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Hookina, December 10.

PRESENT.—Messrs. Stone (chair), O'Connor, Kelly, Sheridan, Murphy, Henschke, Cam, and Madigan (Hon. Sec.).

LUCERNE-GROWING UNDER DRY CONDITIONS.—Mr. Murphy reported that he had grown a small plot of lucerne successfully without irrigation. He had so far taken two cuts off it. Mr. Henschke had about half an acre, from which he had taken four cuts this year. He had been feeding with it four horses and a foal right through the harvest, and in addition to this had stacked some as hay. He found that horses and cattle did well on this fodder, either freshly cut or in the form of hay. It was advisable to thoroughly scarify the lucerne in the winter. The best local soil, in his opinion, for this crop was about a foot of sandy loam over clay. Every farmer should endeavor to grow a patch of this fodder, as, in addition to the stock mentioned, it was good for pigs and fowls.

Wilmington, January 11.

(Average annual rainfall. 17½ in.)

PRESENT.—Messrs. Payne (chair), Jacobs, Scholefield, Slec, Farrell, Litchfield, George, J. and G. Schuppan, Robertson, Zimmermann, and Jericho (Hon. Sec.).

CONTROL OF SEX BY SPAYING.—Mr. Slec reported on experiments carried out by himself as follows:—In October, 1908, he spayed four two-year-old heifers. The near side ovary was removed from two, and the off side organ from the other two. He also took the tip off the horn on the side spayed in each case, so that there might be no possibility of mistake. In June, 1910, a heifer which had been operated upon on the near side calved a heifer calf, and in the same month and in July the two heifers spayed on the off side also had heifer calves. The remaining heifer had a bull calf in October. It was therefore his opinion that the removal of one ovary would not control the sex of the offspring. [It will be interesting to note whether in future the heifers give birth to calves of the same sex as before, or of the opposite sex.—ED.]

Wirrabara, January 7.

(Average annual rainfall, 30 in.)

PRESENT.—Messrs. H. E. Woodlands (chair), W. W. H., and E. J. Stevens, Curnow, A. Woodlands, Bowman, J., E., C., and G. Hollett, Hoskins, Pitman, Thiselton, P. and H. Lawson (Hon. Sec.), and fourteen visitors.

ORCHARD PESTS.—The following paper was read by Mr. P. Curnow:—"It would seem that as time goes on and advances are made new pests and diseases are met with. Some troubles seem to be brought about by new methods of treating soils, new methods of pruning, and in other ways. He who will adopt the treatment which has been successful in the experience of others will be more likely to succeed than the man who leaves nature to cure her own afflictions. Since 1894, when codlin moth first made its appearance in this district, it has been regarded as the worst enemy of local fruitgrowers. While peaches and apricots are in some seasons subject to curl leaf and shothole, and trouble is sometimes experienced from sandflies, apple-growers have more to contend against in one season with codlin moth than all other pests put together. Spraying thoroughly with the more recently discovered arsenate of lead is entirely successful. Growers may now hold this pest in check by spraying with a good brand of arsenate when the petals have just fallen and again two or three weeks later. This will ensure almost complete immunity from this scourge. If an orchard be badly infested it is wise to give a third spraying before Christmas and a fourth in January. This will completely destroy

the moth for that season. The writer is convinced that a thorough spraying later than is generally given in this district would eliminate all risk of loss from codlin moth. Where the seasons are long and dry, as they are here, the moth has a long hatching period—practically from October to April. If the trees are sprayed only up to Christmas three or four months remain in which the pest will hatch several times, and it matters not how carefully one may have previously sprayed the trees, numbers of grubs escape, especially in large trees, and go on increasing till the end of the season; so that unless the trees are again sprayed these go on multiplying until spraying becomes just as big a problem in the following season. In late varieties especially February spraying is of considerable benefit. I would suggest, however, that export varieties be not sprayed within several weeks of picking, as the arsenate is rather hard to rub off. The whole of the foregoing remarks apply to the pear as well as to the apple. Codlin moth is the only pest that pears are subject to in this district. Such stone fruits as plums and cherries are immune from any serious pest, except birds. Curl leaf in peaches is the worst disease to which the genus is subject. Ordinary Bordeaux mixture, if made with good lime, is a certain preventive if applied just when the pink of the flower is showing. The same remedy will cure shothole in apricots. The principal difficulty here lies in the fact that good lime is difficult to obtain. This season the writer used 'Our Jack' brand of Bordeaux paste with only indifferent results. Many curled leaves appeared on nearly every tree upon which it was used. Sandflies are an apricot and peach pest only in extraordinary seasons. Last season I used Swift's arsenate of lead on peach trees that were badly attacked, but it is not possible to say whether any good results followed, as the fruit was injured badly before the remedy was applied. Sandflies will rarely attack apricots or peaches if all grass and refuse around the trees be kept down. It is only when the flies find a ready harbor under such a protection that they attack the fruit close at hand. This season these flies are very numerous in the forest upon Scotch thistles and blackberries, but fruit has not been touched. The most difficult orchard pest to deal with is the bird nuisance. Crows, miners, wattle birds, parrots, and starlings are yearly increasing in numbers, and growers are almost at their wits' end to know what to do to protect themselves. Shooting is an effective remedy, but costs too much in time. The birds fly before the shooter from one part of the orchard to another, making it difficult to kill any appreciable number. It pays best to trap crows in 'possum traps baited with rabbits, but other birds can only be shot. If growers everywhere would take concerted action to destroy all bird pests throughout the year the trouble could be greatly minimised. This season I intend to try feeding starlings on good wheat for a few days and then put out poisoned grain. For shooting birds a '410' bird gun is best, as it will kill to 30 yds., and the ammunition is cheap. A very serious pest, which will prove the most disastrous that has so far appeared in this district, is the root-borer beetle, which attacks apple trees. For many years growers all over this district have complained of 'die back' in apples. No reason in many cases could be advanced for the sudden going off of sturdy, healthy trees. On poor limestone land apple trees will flourish for about 10 years. After that time they start to die off at the tops, finally dying out altogether. The writer has had this experience, and is assured that it is a waste of time planting such land. But many other cases have come under his notice where trees have been badly affected in the same way and have died. In an orchard now seven years old several trees when three years old started to die back. As these were on a narrow strip of limestone crossing the property it was thought that this was the cause of the difficulty; but when other trees on better land showed signs of going off, and finally died, some other cause had to be sought. Last winter many dead and affected trees were dug out and examined, and then it was found that the whole cause of the difficulty lay in the fact that a root-borer of some kind was at work. Roots up to 1 in. and more were quite tunnelled out and the base of the trees quite riddled with borings. Further search revealed the larvæ of a beetle. These insects were nearly $\frac{1}{2}$ in. long: flat, and yellowish white in color, with a brown head. They bore spirally round a root, thus ring-barking it all the way. The sap supplies are cut off and the tree gradually dies. The first symptom noticed is the dying of the leaves on odd branches. Gradually the leaves fall, leaving the tree bare, and the wood slowly dies and the tree assumes a dry, reddish appearance. As many as 20 larvæ were found under one large tree. This tree had not even the appearance of die back, but will probably go off this summer. Since the spring a sharp lookout has been kept, and many beetles have been caught. The beetle is about an inch long; is yellow in color striped with brown. The head is long and narrow furnished with long strong jaws; the mandibles are also long and very powerful. The male is much smaller than the female. Efforts have been made to discover all possible about this ruinous pest. It has been found that the insects mate in October and November, and that they are

generally only to be found on the trees in dull or cloudy weather. They are easily caught. How the trouble is to be remedied the writer cannot even suggest. Certain vendors of arsenate of lead claim that their remedy will kill the beetles if applied to the leaves of the tree. As spraying has been carried on for seven seasons in a most consistent manner in one of the worst affected orchards in the district, and as Kedzie's mixture was used for four seasons and arsenate of lead for three, and as the pest is certainly spreading every season I do not believe that any mixture applied to the tree leaves will prove of any use in combating this beetle. With the object of ascertaining something in this connection, beetles were recently placed in an observation box and supplied with apple leaves from newly sprayed trees. After a week or so some beetles certainly died, but although the sprayed leaves were renewed they appeared to be untouched by the beetles. The writer is convinced that any remedy to prove effective must be applied to the roots. I am about to try 'Apterite,' a remedy made by the manufacturers of Cooper sheep dip, and I will report results to members later. I have wondered if flooding the trees and their vicinity for several hours would drown the larvæ. The vendors of Swift's arsenate of lead claim that there are 44 varieties of root-borers in Australia. In view of the fact that this pest is indigenous to this district, and has been known for over 20 years, growers must realise that a great difficulty confronts them. I hope the Department of Agriculture will finally succeed in finding a remedy. Unless something can be done, and that speedily, several orchards around here will become worthless, as the disease is apparent to some slight extent in quite a number of orchards."

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Port Pirie, January 14.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Munday (chair), Johns, Welch, Hawkins, McEwin, Teague, Jose, Smith, and Wright (Hon. Sec.).

FEATURES OF 1910.—Mr. Hawkins read the following paper:—"The first two months of 1910 were dry, and at times warm. The exceptionally heavy rains and wintry conditions of March started the grass splendidly, and very early feed seemed assured. The very dry April and part of May spoilt all chances of early feed, and what promised at one time to be a very early season proved to be the opposite. Strange to say, a few paddocks held out over the dry spell. One paddock in this district, although it was lay land, carried feed 2ft. high at the end of April and early May. This looked very strange. A great part of seeding had to be done under very dry conditions; in fact, it was difficult to know when it was safe to sow. A number of farmers, after waiting a long time, were surprised to see patches shoot and grow vigorously. I took particular notice of some of these patches. They thrived well all the year, and gave the best results at harvest time. When the rainy season did begin it was very wet, and those who were a little behind with their seeding will have cause to remember it. The fallowing was much delayed with excessive rain, which made the work very heavy indeed. Weeds grew apace, and dirty fallow was the order of the day. We had an abundance of late feed, consisting mostly of barley grass and dandelion. Considerable areas of fallow have not been worked down to a nice tilth, owing to the want of time and horseflesh. Sheep had to be brought into service to help keep the fallow in a respectable condition. The absence of frosts, and later of hot north winds, was a remarkable feature of the season. The continuous northerly winds during the winter and southerly winds during the spring and summer were also remarkable. The whole season, although too wet at times, seemed to be favorable to a bumper harvest. Heavy snowfalls occurred on several occasions in many parts of the State, and falls took place as late as October. I believe a light fall in December was recorded. It was reported that red rust had made its appearance; and as a quantity of soft wheats were sown, and also a lot of late sowing had been done, fears were entertained in some quarters that damage would be done by that much-dreaded disease. But I do not think we suffered much from red rust. The real damage was done by 'takeall,' although it made its appearance much later than is usual in most cases. A good hay crop could have been obtained where afterwards the disease called 'takeall' accounted

for quite half the grain yield. My experience was that instead of the wheat ripening after filling it died away, and I have harvested quite half shells of grain instead of plump corn. What did not blow out with the chaff found its way into the screenings, and a small percentage was bagged with the wheat and marketed. The harvesting of the crop had to be carried out under very cool and often damp weather conditions, operations extending over a long period. The results from different treatment of land proved most interesting, *e.g.*, cases such as these:—Grass land ploughed after March rain and harrowed, the last week in May cultivated, drilled with Gluyas, harrowed; yield, 26bush. average. Stubble land burned, cultivated after March rains, cultivated early in May, drilled with Eclipse; yield, 26bush. per acre. Very dirty stubble land, burned, cultivated, and drilled with Marshall's No. 3 in the middle of May; yield, 16bush. average. Well-worked early fallow, cultivated and drilled in the middle of April with Gluyas, Marshall's No. 3, and Federation; 7bush. average. Fallow on sandy land sown early in April; yields, Marshall's No. 3, 12bush.; Eclipse, 7bush.; Gluyas, sown after rain, 14bush., all in the same paddock. The whole season promised exceptionally well, but the results proved very disappointing in most cases in this district." Mr. Teague, in opening the discussion, referred to the record rainfall of the past season, and said that in consequence some of the fallows were in a very bad state, and would need an extra amount of work to prepare them for next seeding. Mr. Johns said that a portion of the land in this district had not been as productive as it should have been on account of the excessive rain which had fallen during the season. This especially was the case of crops on the sandy land, which made little headway at first, but made a splendid recovery during the latter part of the season. Another feature which accounted for the deficiency in the yield was the damage done to the wheat by the very cold southerly winds. Lays of country exposed to the south suffered severely in this respect, while crops on the more sheltered sides came out all right. "Takeall" had again affected the crops last season to a considerable degree, which went a long way to prove that wet conditions were favorable to the propagation of the disease. Referring to varieties of wheat, in his opinion Gluyas was the safest and best wheat for the district. Although this variety was rather weak in the straw, and sometimes had a tendency to go down, it yielded better than Eclipse. Gluyas was worth taking a little trouble with, and if farmers were to adopt the method of selection as recommended by the Acting Director of Agriculture it would be the means of increasing the yield of wheat for the district. Wheat sown the last week in May had given much better results on Mr. Johns's farm than that which was sown early in the season. It was of stronger growth, and the ravages of "takeall" had not such a marked effect on it. Altogether the farmers had reason to be satisfied with the results of the past season. Mr. Greig said the rainfall at his farm for last year was 27·14in., and although it was altogether excessive for the sandy country it had suited the crops on the stiff land, and they had yielded well. It had been a bad year for Federation. He had grown some of this variety last season, and had found that many of the heads were lost owing to the straw breaking off about 6in. below the head. This, Mr. Greig had been given to understand, was a characteristic of Federation. Small patches in the crop had died off, but he was not prepared to say that this was caused by "takeall." On pulling up the affected plants the roots were found to be less than an inch in the ground. Apart from these troubles Federation had yielded a splendid sample of plump grain. Mr. Welch said that his crop of Federation showed a considerable amount of red rust in the early part of the season, but it recovered later, and a satisfactory yield of good sample was obtained. The crop was practically free from "takeall." Gluyas yielded well, but went down badly. There appeared to be no difference in yield of between crops sown on fallow and on stubble land. Mr. Jose said that in his experience Federation gave better results when sown on stiff land. It did not yield so well on sandy land. Mr. Munday considered that the unusual features of the past season had exploded many recognised theories in regard to the cause and effect of "takeall." Crops on well-worked fallow land had been affected by "takeall" to a greater extent than those which had been grown on stubble land. The crops thrived well until about hay time, when the "takeall" made its appearance, and within a fortnight a large amount of damage had been done. Mr. Munday did not think the damage to his crop was wholly attributable to "takeall," as the late frosts may have affected it to a certain extent. He had found the disease on wheat, barley, spear grass, and barley grass. [Not the true "takeall" fungus!—Ed.] Mr. Munday agreed that it paid to grow oats with a view to starving out the "takeall" fungus. It would pay to grow oats and barley, and to graze the land for a few years, if by so doing it would be improved for wheat-growing.

ANNUAL REPORT.—The Hon. Secretary presented his report, which showed that 10 meetings had been held, with an average attendance of 9·6 members; 14 members were

on the roll. Papers on the following subjects were read and discussed :—" Co-operation Among Farmers," "Takeall," "Queensland," "Farm Erections," "Trip to Europe," "Woburn Experimental Farm," "Tree-planting," "Co-operative Machine Shearing," "Engines for Farm Work," and "Rotation of Crops."

COLLEGE SEED WHEAT.—Mr. Johns complained that he had procured seed wheat from the Roseworthy College which contained many other varieties. King's Early (Red) was fairly pure, but Gluyas seed, he said, contained two varieties of barley and several other wheats. Other members present spoke in a similar strain. [The Principal states that everything possible is done to send out good seed wheat. At no time, however, can the College, nor anybody else for that matter, guarantee more than a 98 per cent. to 99 per cent. purity. All wheat sent out is carefully graded. Accidents, however, will occasionally happen, particularly as the College has not yet a special grain-room for treating seed wheat. The College is always prepared to meet on most liberal terms any purchasers that may be dissatisfied with seed wheat supplied.—ED.]

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

Angaston, January 14.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Wishart (chair), Player, Sibley, Smith, Thorne, Ball, Giles, Swann, Heggie, Salter, Stephens, Plush, Clark, Friend, Matthews (Hon. Sec.), and five visitors.

AFFORESTATION.—The following paper was read by Mr. Heggie :—" Many competent authorities have drawn our attention to the fact that there is every likelihood of a great timber famine in the near future. The world's consumption is overtaking the supply at a very rapid pace, and very little in comparison is being done in the way of replanting. As far back as 1901 Dr. Schlich pointed out that the consumption of Great Britain, Germany, Belgium, and France was 37,940,000 tons. These countries produced 21,800,000 tons, and imported 16,140,000 tons. The supply from other European countries was estimated at 15,130,000 tons, which left about 1,000,000 tons to be obtained from other sources. The immense pine forests of the United States and Canada are being consumed at an alarming rate. In the United States the consumption exceeds the production by 33 per cent., and it is stated that the existing stand of timber would only last about 50 years. In Canada the wood pulp industry has accounted for enormous quantities of spruce being cut. The following figures will give an idea of the huge quantities of timber used in the paper pulp industry. Some years ago Sweden, Norway, Finland, Canada, and the United States used annually about 11,300,000 tons; 600,000 acres were annually required by the United States for paper pulp alone. It is estimated that seven acres per day are required by one New York paper. We have in Australia without doubt some of the finest hardwood timber in the world. Unfortunately it is limited, and the consumption has nearly caught up to the available supply. In Western Australia the jarrah stands pre-eminent among the hardwoods, but at the present rate of consumption it cannot last many years. In South Australia we have the red gum, which is one of the most useful of the hardwoods grown; and here again the supply is limited. Both the jarrah and red gum take many years to come to maturity, so there must be a long interval without these woods when the present matured trees are consumed. In our own district redgum saplings of 40 years of age are of no use as timber, and I believe they are of little use until well over 100 years of age. Australia is not abundantly supplied with pine timber, the greater portion that is consumed being imported. It has been demonstrated, as far as South Australia is concerned, that some species of pine thrive and come to maturity much more quickly than in their native countries. This particularly applies to the Remarkable pine (*Pinus insignis*), of which we have a splendid sample in Messrs. Smith & Son's and Trescowthick's gardens on the south side of this town. In the Wirrabara Forest as many as 28 apple export cases have been made from one Remarkable pine 20 years of age. The Conservator of Forests (Mr. Walter Gill) estimates that a gross return of £200 per acre may be made from Remarkable pines of 21 years' growth under favorable conditions. Not many people are able to wait 21 years for their first return, so that afforestation should be a State matter; but we may all do a little individually,

and might perhaps be assisted by the State exempting lands set apart for timber purposes from taxation, and in other ways. South Australia has a number of forest reserves, comprising about 155,231 acres, of which about 14,897 acres are planted. The pines which have done well so far over a wide area are the Remarkable pine, the Maritime pine (*Pinus maritima*), and the Aleppo pine (*Pinus halepensis*). These pines do particularly well in our own district. Another tree that does well with us is the sugar gum, and we might well plant some. Our red gum is daily growing less, and even now many of us are using iron posts. What the position will be in 50 years' time it is difficult to say. The two principal things to be considered when planting young trees are the suitability of the subsoil and the position in regard to frost. In our own district, with an average rainfall of about 20in., and where the red gums grow to perfection, we have nothing to fear in regard to the subsoil not being suitable. The pines and sugar gums that have been planted during the last 20 years prove this. Damage by frost can be overcome by giving the young trees some artificial shade during the first year or two of their growth. I should like to refer to the way in which timber is felled and matured. So far as our district is concerned this matter is never taken into consideration, and trees are felled at any time of the year, and the timber generally stacked in the open and matured in varying temperatures. I have noticed that timber that is cut when the sap is down is better preserved and stands much longer than if cut when the sap is in full flow, and I cannot understand the Government purchasing timber for railway purposes cut full of sap and left out in the open to mature with the temperature at anything from 80° to 120°, with the consequence that it is full of sun cracks 6in. and upwards in length. I feel quite certain if this timber was cut when the sap was down, and matured under cover, its life would be much longer. There is a wheelwright in our district who will make a wheel and guarantee that the nave will last a lifetime. He has the timber cut for the naves when the sap is down. The timber is then placed in an underground cellar, and allowed to mature there for 12 months at least. There is great room for improvement in the matter of felling and maturing timber, and we have still a great deal to learn on the subject, and as good timber is becoming yearly harder to get it behoves us to give this matter more attention and do something to counteract it." The paper provoked a great deal of discussion, and members generally agreed with Mr. Heggie. On the motion of Mr. Ball it was decided to express appreciation of the efforts of the Government to encourage afforestation, and suggest that steps should be taken to prevent the wanton destruction of immature timber. It was decided on the motion of Mr. Smith, seconded by Mr. Salter, that a suggestion be sent to the Commissioner of Crown Lands that a portion of land be set apart in all new hundreds for the conservation of timber.

Freeling, January 13.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. A. Mattiske (chair), Noack, Elix, Neindorf, Koch, Kock, Block (Hon. Sec.), and two visitors.

AGRICULTURAL IMPLEMENTS.—The following paper on this subject was read by Mr. Noack:—"This being a very large subject, it is only possible to touch upon it very briefly. In comparing modern implements with those which were in use only 10 to 15 years ago, it is quite apparent that wonderful progress has been made. The progress is most evident in the implements used for pioneering work, such as bringing new mallee and other rough country under profitable cultivation, and as a rule the most up-to-date implements are in use in the back blocks of the country, without the aid of which the work of developing such rough land would be very slow. It is recognised that the latest implements are more efficient and not so cumbersome as those built years ago, and considering that one ordinary farm horse is worth probably as much, and often more, than a new implement, it is poor economy to try to manage with an old implement at the expense of an extra horse. It is common to see a valuable team of horses working an old-style of implement at a disadvantage, while if the farmer would purchase something more suitable and efficient he could cultivate the same area of land per day with less horses, or could cultivate considerably more with the same team. It should not be taken for granted that a new implement is adjusted and set to the best advantage as it is received from the factory. Very often an intelligent and practical farm hand will find it necessary to make various little adjustments before complete satisfaction is secured, even with the best implement. Then again, it is essential to keep it in proper repair in order to obtain the full advantage of its durability. To keep an implement in repair the use of fencing wire in lieu of bolts should be avoided. Select the right class of implement to suit the

soil to be worked, for it is quite possible that an implement might do very good work in one locality, while it would not suit another. Free and sandy soil can be most economically and profitably worked with disc implements. The same applies to heavy soil if worked when dry, whereas when it is wet and sticky a disc implement may prove useless. It has been proved that land in dry districts when ploughed and cultivated with disc implements, especially when followed by a sub-surface packer, yielded much better than land worked by ordinary methods of cultivation." [For results see page 642 of March, 1910, issue of *Journal*.—Ed.] In the discussion which followed, Mr. Neindorf said it would pay a farmer every time to keep his implements in tip-top condition, as it would save both implements and horses. The Chairman and Mr. Elix said farmers should try to thoroughly understand their machines, and spend some thought in adjusting them. Sometimes implements and machinery were sent back to the manufacturer when there was really nothing the matter with them. Arrangements were kindly made by Mr. Noack to afford an opportunity to inspect a disc plough, as many farmers in this district had not seen one.

Gawler River, January 13.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. A. M. Dawkins (chair), J. and B. Hillier, Rice, Richter, Davis, Roediger, Bray (Hon. Sec.), and one visitor.

BUDDING FRUIT TREES.—Mr. F. Bray gave an address and practical illustrations on the budding of fruit trees. The need of budding, he said, arose in working young seedling stocks, and also when trees in bearing proved to be unsuitable varieties. Budding was more simple than grafting, and also much quicker. The only articles required were a good sharp pocket-knife and a ball of candle cotton. The most suitable time for deciduous trees was about November, but where water was available for irrigation they could be done at any time in the growing season when the sap was active and the bark separated from the wood freely. The first operation was to remove some of the leaves from the branch where it was intended to insert the bud, to secure a clean level surface. Procure some twigs from a good bearing tree of the variety desired. The best buds to use were those in the middle of twigs with only one leaf or bud, discarding those at the bottom and top. Remove the bud with a good clean cut, starting below the bud, about half to three-quarters of an inch, and cutting upwards, taking a piece about 1in. long. Remove the piece of wood, being careful not to injure the bud. Make a T-shaped cut in the stock, lift the bark carefully on both sides, and insert the bud. After inserting the bud bind up firmly but not too tightly with candle cotton. In about 10 days loosen the ties. A fortnight later they could be removed. If the bud had taken properly, the leaf stem of the bud readily fell off, but if the stem was dry and shrivelled the bud had failed, and the best plan was to insert another bud a little higher up or lower down on stock. Buds that had taken were best left dormant until winter, when the stock should be cut back to within an inch or two of the bud. As a general rule it was best to work trees on their own stocks, such as peach on peach and apricot on apricot. It was possible to work on other stocks, and in some districts peaches did well on almond stocks, but they did not always answer, and the wisest plan was not to take any risks.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Yorke town, January 14.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Anderson (chair), Bartram, Jung, Correll, Koth, Domaschens, and Rohrig (Hon. Sec.).

FARM OUTBUILDINGS.—At the November meeting Mr. J. F. Davey read the following paper:—"A farmer who has spare time between seasons and spare cash can usually find profitable employment for both in adding to or improving the outbuildings on his farm. There are scarcely two farms which are exactly alike in their requirements. There are some essential points which are common to all, and it is chiefly to these that I wish to draw attention. I think it a wise policy to make all buildings of a substantial character,

with plenty of room for all requirements, and with regard to the saving of labor in usage. In stable construction many farmers are now doing away with separate stalls, or at most having them wide enough for two or three horses to feed together. It is much more convenient to have single stalls, in my opinion, as each horse then knows his place and keeps to it, and his harness hangs ready to hand. Where the saving of rain water is no consideration, a good straw roof is probably better for a stable than an iron one. It is a great saving of time and a convenience in every way to have a water trough in the stable yard. Even if the well is situated several chains away, it is cheaper in the long run to lay piping to the stable than to have to travel four or five times a day from stable to well and back again. If there is no water within a considerable distance, or the supply is uncertain, it is better to have all buildings roofed with iron, and have a large tank alongside the stable. When teams are kept in at night during winter, and especially where the drainage of the yard is not good, some dry covered place should be provided where the horses may lie down. Some people do this by making the stable of extra width, but I think a better plan is to have a shed in another part of the yard which can be kept supplied with clean straw. It is comparatively little trouble to keep such a place clean and dry, as the horses will only go there to lie down. A good material for flooring stables or yards is limestone which has been left lying for some time on salt ground. It sets very hard, and will never cut up with traffic. But beware of putting it close to a masonry wall, on account of the salt. A closed-in stable in this climate is an abomination. It is best to have it facing the east. A post and rail fence is preferable to a high stone wall for the yard, as the former lets the breeze through. Clean out stables as often as possible; cart the manure straight on to the land and plough it in. I believe it is well worth while to construct a shed with an iron roof and a concrete floor to stack hay in. The roof should be at least 18ft. from the floor, should be a trifle wider than the stack all round, and fitted with guttering to carry off the water, which would otherwise be drifted by the wind on to the hay. If the posts are sloped outwards slightly at the top the hay can be built up against them, and half the difficulty of stack building is thus overcome. We often have trouble at hay time through half-finished stacks getting wet and having to be opened up and dried, all of which is avoided by having a permanent roof as described. In addition to this there is no thatching and no waste of hay. In selecting a site for a haystack have room to unload on either side, so that the stack can be more evenly trampled. Advantage can also be taken of the wind, so as to unload on the cool side of the stack and have the wind to assist in pitching. It has been suggested that to keep mice from the hay a farmer could build the stack on piles, the floor to project all round, so that mice could not get over it. If that could be carried out successfully, the outlay would be amply repaid. But even if the haystack cannot be made mouseproof, I see no reason why the barn should not. If the walls are stone, they can be cemented right up to the roof, or if it is proposed to build a barn of iron the whole structure could be built on piles about 2ft. high, and would be much more convenient for loading and unloading wheat than if the floor were on ground level. There should be a projecting ledge under the door over which mice could not climb, or else a piece of tin fastened round each pile. In spite of all care, mice will occasionally find their way in, but any intruders can be disposed of when the barn is empty, and at the worst nothing like the damage will be done to the wheat that there is when the walls and floor are honeycombed with holes and shelter the vermin in hundreds. It is best to have the sheds for machinery some little distance from the stables and haystack, as there is then less danger in case of fire. They should be open on the south side, so that the sun will never shine in. There is not usually very much rain from that quarter. I think the most convenient place to keep the buggies, carts, and other light vehicles is just outside the stable-yard gate, handy for harnessing. That shed also is best with a southern aspect, and doors can be dispensed with. A matter that usually receives very little attention is the cow shed. Many people prefer not to bail their cows, but milk them anywhere, and about half the milker's time is taken up with following the cow around with the bucket in one hand and a stool in the other, waiting for the beast to be pleased to stop. It is much better to have a bail in a shed and always bail the cows. The shed should be about 12ft. long, about 6ft. wide, and 7ft. high, and enclosed in one side and both ends, the open side being on the south, as it is very unpleasant to have a hot sun shining on one's back when milking. The floor should be well raised, with a good slope towards the back, or toward the side opposite the milker, if drainage can be carried that way." In the discussion various opinions were expressed on the points raised. Members were unanimous on the advisability of building an open shed for hay. On the question of having the water trough in the stable yard the general opinion was that it was only advisable if the trough was a small one and frequently cleaned out.

WESTERN DISTRICT.

Mitchell, December 17.

PRESENT.—Messrs. D. Green (chair), Ness, F. and R. L. Myers, Miller, Molloy, H. W. and W. Gregory, jun., McCormack, Jericho, O. J. and P. Green, Ward, Carriock, Sampson, Dorward (Hon. Sec.), and two visitors.

CARE OF IMPLEMENTS.—Mr. Myers read a paper under this title. Every farmer, he said, should know the pleasure of having his machinery run smoothly and well; with all the nuts tight, no jerking, squeaking, or bearings running hot. To keep the blacksmith's account as low as possible he recommended the following practice:—"Oil new machinery frequently, because the parts and bearings all fit tightly, and are apt to get hot. Be careful to see that oil-holes are clear, and that the lubricant actually reaches the bearings. When opportunity offers, *e.g.*, while the team is having the mid-day meal, tighten up all nuts that may have worked loose. After a job is completed put the machines or implements in thorough working order for the following season. Put a coat of grease on the mouldboards of ploughs to prevent them from rusting. Grease the needle of the binder, and pack the canvas elevators in a mouse-proof box. Give all the wood-work a coat of oil, and then put all machinery under cover." A good general discussion followed, in which members agreed with the advice tendered in the paper.

HAYMAKING.—A paper on this subject was read by Mr. McCormack, principally from page 429 of October issue. Mr. McCormack thought the best hay wheats for this district were Marshall's No. 3, Purple Straw, King's Early, and Early Purple. In the discussion which followed members were of opinion that haystacks should be carefully covered.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, November 18.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Hill (chair), Bone, Venning, T. and A. H. Fidge (Hon. Sec.).

METHOD IN FARM WORK.—Mr. T. Fidge introduced this subject for discussion in a short paper. Farm horses, he said, should be fed at regular hours each day, and in the busy season the work should be planned so that they should be in harness at regular times. The greatest care should be exercised to avoid sore shoulders. The stables should be warm and dry in winter, to reduce to a minimum the possibility of the horses getting chills when coming in hot from work. A good barn should be constructed, to keep out rain and poultry. Water for stock should be so situated as to avoid unnecessary travelling for working animals. Implements, tools, &c., should each have their proper place, and should be kept under cover when not in use. Discussion followed, in which members agreed with the views expressed.

SOUTH AND HILLS DISTRICT.

Forest Range, December 15.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. F. Green (chair), H. A. and E. Green, Vickers, Pollard, Rowley, and Monks (Hon. Sec.).

EFFECT OF SYSTEMATIC PRUNING ON SUCCESSIVE CROPS.—The Chairman read the following paper on this subject:—"Everyone connected with fruit-growing during recent years has been faced with the problem of how to produce average yearly crops, and so avoid the feast and famine conditions which prevail alternately at the present time. At one time summer spur pruning was declared to be a remedy, but we must admit that it has not had the desired effect. That such a condition of things is desirable is admitted by all, but some declare that it is impossible of realisation, as it is not natural

to a tree to continually produce crops of fruit. It may not be natural to do so, but how many things have we realised which were not natural by assisting nature? We all know that in a young orchard an apple tree will bear several consecutive crops, and finally an extra heavy crop will cause it to take a season's rest. Why does the tree crop regularly while young? Is it because of its vitality, or is there something in the soil that is required for producing fruit which afterwards becomes exhausted and the tree has to wait until more of that particular constituent is available before it can produce further crops? In watching an orchard an experienced grower can tell when the first heavy crop of fruit is coming, and my idea is to save the tree from overblossoming and overbearing by judicious thinning of the fruit spurs. It is well known that a tree produces at least 50 times more flowers than are required for a crop. I consider the amount of energy and plant food wasted by this flowering should be conserved for the future use of the tree. If we have not been successful in producing average crops in the past this is no reason why we should leave off trying; so my first operation in a young orchard would be to thin out heavily the fruit spurs the year that I expected my first heavy crop. The tree would have far less strain imposed upon it, and would probably produce a crop again the following season. Our method of pruning at present is opposed to this principle. We are getting our trees too dense, and allowing far too many fruit spurs. Besides having a bad effect on our fruit by overcrowding, shading, and loss of color, we are asking too much of our trees in supporting twice as many spurs as are required, besides producing an abnormal sheet of blossom. In this respect I would advise thinning the spurs, keeping the mains well separated from each other, and in the case of very strong-growing trees not to cut back the mains every year, as this practice tends to produce too much growth and less fruit. Growers hold that manuring orchards does not pay. Possibly not, if we do not know what we are doing. It seems to me in our older orchards where the trees crop a year and rest a year that possibly after a heavy crop the tree cannot produce more fruit until something has been replaced in the soil which was taken out by the heavy crop. I would suggest that an analysis of the soil should be made before and after heavy crops, so that we may know what should be returned to the soil. I am convinced that if we prevent our trees from exhausting themselves too much, and find out what particular constituent is taken in large quantities, so that we may assist nature to keep up the supply, the tree can be kept in normal vigor, and we shall have largely solved the question of average yearly crops."

Mr. Vickers, in discussing the question, thought that when men could control the weather they would be able to control the crops. He had tried several styles of pruning to build up spurs, and had also tried all kinds of manures, but was not at all satisfied with the results. He did not think he was paid for the trouble with apple trees, as they did not respond to the treatment; but cherry trees did much better. Mr. A. Green tried stable manure upon a small patch of apple trees, and so far the results seemed good. When there was evidence of a big crop it was time to prune the trees. Dunn's Seedling trees that were pruned this year were bearing, but those not pruned were bare. He would prune fairly hard in such a season. Mr. H. Green would like to know if new vigor would be given an old orchard if the soil were broken up deeply. [The Horticultural Instructor replies:—The trees in an old orchard can often be reinvigorated by breaking up the soil deeply early in winter, allowing it to lie rough until spring. This treatment should be accompanied by a good hard pruning, applied to the top. This may take the form of shortening the leading shoots, and thinning them out if very dense. The laterals should also be shortened, and the spurs—if abundant—thinned out considerably. If the soil be impoverished the addition of a couple of inches of farmyard manure, either fresh or decayed, prior to the digging will help very much. Failing this a good sprinkling of bonedust could be used. The tillage to follow should be a skim digging or shallow ploughing in spring to bury weeds, and then the surface kept pulverised with a fork, hoe, or cultivator whenever it tends to consolidate through the rain or irrigation during the summer.—Ed.] Mr. F. Green had seen Dunn's Seedlings pruned whilst in bloom, with splendid results in the bearing, whilst other trees near by which were not so treated did not bear.

Hartley, January 20.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), O. Wundersitz, W. and C. Brook, Phillips, Pratt, Stanton, Hudd, Symonds, Tydeman, Bermingham (Hon. Sec.), and one visitor.

QUESTION DAY.—This meeting took the form of question and answer, and in reply to a number of questions the following opinions were expressed:—The best depths to plough

in this district is, for stiff land, at least 5in. for fallow, going to a less depth in the lighter soil. The only practicable preventive for takeall at present known is to grow oats for a season or two. Crops on limestone rubble land in this district were very badly affected with takeall this year. In respect to a question asked as to when hens laid most eggs, it was stated that from nine to 18 months was the best laying period. Carbolic disinfectant powder was considered to make the best dip to rid fowls of lice and tick. The dipping should be done on a sunny day, and the birds' heads should not be submerged.

Lyndoch, January 12.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. Kennedy (chair), Hammatt, J. and R. Woolcock, H. W. and G. A. Lawrence, Lawes, and Springbett (Hon. Sec.).

CODLIN MOTH PARASITE.—Mr. J. Woolcock tabled a specimen of codlin moth grub, to which was adhering a parasite. This was forwarded to the Adelaide Museum.

SPRAYING.—Considerable discussion took place regarding spraying fruit trees to destroy codlin moth; and, while recognising the value of this practice, members were of opinion that there was still much to learn in regard to the controlling of this pest.

A LARGE ONION.—Mr. Springbett tabled a large Brown Spanish onion, weighing 2½lbs. and measuring 18½in. in circumference, grown on his property.

Meadows, December 19.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. Ellis (chair), Kleemann, Brooks, Nottage, Warren, Bertram (Hon. Sec.), and one visitor.

DESTRUCTION OF RATS.—The following paper was read by Mr. Warren:—"Rats cause a good deal of annoyance, not only by the damage done to bags, &c., but by the waste they occasion. Now that the harvest is near most farmers will have grain of some kind to store—either as seed wheat, fowls' food, or pigs' feed; so it is necessary to try to eradicate the pests. In parts of this district people have not been able to rear either chickens or ducks, for as fast as the eggs were hatched rats made short work of the young poultry. Remembering a recipe that I had used with success in the mother country, I obtained the ingredients and prepared for battle with the rodents. The method is to feed them for a few nights to make them become accustomed to the smell of the different oils used. When they eat it greedily, mix with the feed a small portion of arsenic or strychnine. The former is better, as it is sweet, while the strychnine is very bitter. After that night's feed you will not see many live rats about. The poison is prepared as follows:—Take 1 quart of oatmeal and 1oz. of sugar, rolled finely; mix together. Add six drops of oil of aniseed, six of rhodium, six of caraway, and six of cloves, also ¼ grain of musk, and mix with the oatmeal and sugar, taking care to bruise the lumps caused by the oils in the oatmeal. This should be done with a knife; on no account touch it with the hand. Now choose a spot frequented by the rats, and place a portion of the prepared meal on a piece of clean board, dividing the meal so that there shall be enough for five or six nights. After the first night the rats will greedily eat it, and others in the locality will be attracted by the smell of the oils on the whiskers, &c., of those that have been feeding; in fact, they will come from all the surrounding neighborhood, and will become so tame that one may easily kill them whilst feeding. On no account attempt to strike them or drive them away. On or about the fifth night mix a small quantity of poison with the night's feed, and in the morning remove what may remain and burn it."

THE FARM AND THE HOME.—This subject was dealt with as follows by Mrs. Warren, a visitor:—"Farming is a very interesting occupation. The most profitable way of farming here would be to have a little of everything, so that if one thing failed another might be a success. Have enough live stock (the best breeds for each purpose), make a special study of each breed and get only the best, and feed them well. Pigs should be well fed and cared for to get them ready for the market as soon as possible. Let the feeder watch the troughs and keep them clean; if any stale or sour food is left from a meal, that is proof that something is wrong. Food not agreeable or given in too large quantities must be emptied before fresh food is given. I find food given very thick to fatten pigs, especially pollard mixings, will give them a dry cough. This, however,

can often be remedied by giving sloppy food. Have charcoal handy and give it them freely. It will be a pleasure to the farmer to make a study of everything about his farm. It won't hurt him to study, but will be an encouragement to find he is improving himself. He will need to grow enough fodder for stock, have hay for sale, milk for factory, or cream for butter; potatoes and vegetables for sale if near the market, also for home use. He must get his pigs and sheep in the best condition for the market if he wants the best prices. Have fowls of the best laying strains, and attend to them properly to get the best results. Grow wattles on the poor land if possible. Chop wood in the slack time for firewood if the price procurable is payable for the work done. Let his boys have a financial interest in the farm. He will soon see the difference in the way they shape when at work, and the keener interest they will take in everything about the place. The girls should be taught to do everything as well. Let them have a share too; give them all a word of praise when earned, or some encouragement to keep doing better. Teach them all you can yourself; have patience with them. Buy a few books and let them experiment for themselves. Every useful thing should be learnt, and learnt well. Give them free use of the sewing machine and an odd scrap of pretty material to make doll's clothes for a start. Cut garments out and help them start, and if they have any talent in this direction they will soon be making garments for themselves. Sewing will not be a trouble to them in later years. Far better this way than letting them grow up in ignorance, no good to themselves, and no good to men who need good wives. Teach them to be careful and considerate in all ways, no matter how much money is at their disposal. If one learns all she can it will always be useful, and the brain box is never cumbersome. Give them an outing occasionally and do your best to give them an enjoyable time. Explain things they cannot understand, and keep their lives as sweet and pure as possible in every way. Instil into their minds the bad influences alcohol and tobacco have on their systems, and keep these out of the home if possible. The main thing is to stay at home to attend to everything and see that all work is done properly. The farmer must be prepared to work more than eight hours if he is to be successful, especially if he has wife and children to care for. We all desire to be prosperous in business, to make some money if we can. Life is more than meat; we must cultivate our ideals; improve our minds in every way possible; do the best with what lies nearest to hand; help others if possible, and in doing so we will find we are helping ourselves."

Meadows, January 16.

(Average annual rainfall, 34½ in.)

PRESENT.—Messrs. Ellis (chair), Brooks, Smith, Nottage, Nicholle, Stone, and Bertram (Hon. Sec.).

THE BROOD SOW—VALUE AND MANAGEMENT.—The following paper was read by the Hon. Secretary:—"A really good brood sow is a valuable asset. Good management counts for much; without it the best sow cannot do her best; with it she will do all that reason can expect. Careless bedding and housing of the sow kept in the sty is very often the cause of cramp and internal disease. Poor or unwholesome food causes internal derangement, weakening the vitality, and bringing on constipation; so the sow comes to her farrowing in a condition promising no good results to herself or her piglings. Improper and neglectful treatment of the 'in-pig sow' are responsible for numberless cases of unsatisfactory litters, such as piglings weak, born dead, and imperfectly developed. They may be numerous, and indeed often are, but numbers count for nothing when there are only three or four fair pigs out of ten or a dozen. The more highly bred the sow the more reason is there for good treatment—not pampering, but treatment born of sound judgment and common sense. To breed and rear strong, sound, healthy pigs, it is essential that the sow should be in good fettle herself—her system free from disease, and her blood pure and healthy. Rich food she does not require, except when suckling her pigs, but she needs a sufficiency of suitable sweet and wholesome food while she is retained as a breeder. If she is running at large in a good grass paddock she will get a good deal of healthy and nourishing food, which only needs in the early stage of carrying her pigs to be supplemented by some good slop; but it is the sow entirely confined to the sty who suffers most when poorly fed. Her system gets out of order from lack of nourishing food. She develops various minor disorders, and lacks the necessary milk for her pigs at farrowing time. It is a bad practice to expose the sow to extremes of weather. In a great many cases should the bedding run short during the winter or early spring the sows are the first sufferers. They are left to lie on the cold, wet floor, and frequently get so cramped and stiff that they can hardly move. Should

the weather permit, the pregnant sow may be kept in the open for the first three months, but for the latter part of her time she should be well fed and comfortably bedded in a dry, clean sty. If the sow is confined to a sty, give her a few mangolds in addition to her daily ration of slops; also a few wood ashes and some charcoal to munch. The less doctoring the sow has the better. Food of the right sort is the best medicine. About three weeks previous to farrowing a fairly liberal diet should be given. Several days before she is due she should be comfortably housed in the sty she is to occupy, with some short, clean, and dry straw. She should not be interfered with unless absolutely necessary. An isolated pen for each brood sow is best, if it can be managed. Keeping her quiet at this time will remove the main source of mortality among the piglings. In the winter or early spring after pigging as much warm slops as the sow will drink should be given. This will satisfy her thirst and keep her from getting up and fidgeting about. If there is any tendency to costiveness at farrowing, a little black treacle mixed in the warm slop given the sow to drink will be most beneficial. It is best not to mate the sow again until the pigs are weaned. Although she may be ready soon after farrowing, there is considerable risk of abortion with so early a service owing to the pummelling given her by a strong litter of young pigs. A good lucerne, rape, or clover paddock is a first-rate place for a sow and pigs. With the fine natural food they get, combined with milk and pollard slops, they will thrive and do well, and at a very little expense to their owner."

Meningie, January 14.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Ayres (chair), Scott, Hill, Martin, Tiller, Tregilgas (Hon. Sec.), and three visitors.

SEEDING PRACTICES.—Mr. Tiller read a paper on this subject to the following effect:—In this district no farmer would break up his best grazing land to grow wheat, but ordinary scrub land was used for wheat-raising. Seed should always be graded. Late wheats he would sow early; they then stood out well, and under these conditions 20lbs. of wheat should give a 25-bush. crop. If he were going to sow the same wheat on, say, May 20th, he would put in 30lbs. of seed. Early varieties of wheat needed from 35lbs. to 40lbs. per acre, as these did not stool out so well. Finally he was of opinion that only very best graded seed should be used, so that practically every grain would germinate. Overseeding land was like overstocking. Just as overstocking resulted in poor and stunted stock, overseeding resulted in poor plants with only one or two heads on each. In the discussion which followed Mr. Martin was of opinion that the quantity named was insufficient, even though it might be good graded seed. The Hon. Secretary supported the statement made in the paper, provided the seed was all good. On a vote being taken, the majority were in favor of putting in from $\frac{1}{2}$ bush. to 1 bush. of wheat per acre.

SOUTH-EAST DISTRICT.

Kalangadoo, January 14.

PRESENT.—Messrs. Riddoch (chair), Kennedy, Tucker, McDonald, Ellison, Guerin, Bennett, Hunt, Osborne, and Sudholz (Hon. Sec.).

HARVESTING CEREALS.—An interesting discussion took place on harvesting. For the past 18 years the farmers in this district had almost exclusively hired threshing machines to take the corn from the straw and put it in bags. Owing to the enormous expense of binder twine, stooking, carting, stacking, and threshing, several farmers decided to purchase harvesters this season. Although the weather had been very unfavorable at times, these harvesters were doing satisfactory work. Members disagreed as to which was the better—threshing as in the past, or using the complete harvester. A vote was taken, resulting in five for the harvester and three for the binder and thresher. The Hon. Secretary tabled two samples of Federation wheat. One had been through the

threshing machine, while the other was bagged with the harvester. Members thought the harvester sample the better, there being less cracked grain than in the sample from the thresher. Mr. Guerin said rye could be cut before it was quite ripe without injury to the grain.

Mount Gambier, January 14.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Sassanowsky (chair), Pick, Ruwoldt, Watson, Major, Schlegel, Engelbrecht, and Collins (Hon. Sec.)

CULTIVATION OF FERN COUNTRY.—Mr. H. Pick read a paper on "The Treatment of Ferny Land" as follows:—"It must be clearly understood that the land referred to is poor, lightly grassed, and stony country in its present state, unfit for cultivation, such as is met with in this part of the South-East, particularly near the coast. Every landholder in this district knows what a great pest the ferns are. A fresh growth comes up every year; therefore one year's growth must die off annually. If the dry ones would decay like other vegetable matter they would be of some value to the land; but, unfortunately, such is not the case. Dry ferns will accumulate and lie on the ground for years, until the grass becomes choked right out in places, and what little does grow is not relished by sheep. The question is how best to get rid of the accumulation of rubbish without injury to the grass. There is only one way to do it, that is, by burning off at the end of summer, as soon after a fall of rain as possible. If the burning is done early in the summer, while there is moisture below the surface, there will be a vigorous growth of young ferns. If the ground is hot and dry on top, all the grass as well as the seed is burnt, and the surface is left smooth and bare, exposed to every wind that blows, but if the burning is done while the surface is damp, the rubbish is cleared off without injury to the grass; even the seed will not be destroyed, and there will be a nice growth of young feed, which, if allowed to get a good start before being stocked, makes a splendid pasture for the young sheep. It is surprising how weaners will freshen up on the burnt paddocks. Later it will be found good for lambing ewes. Another advantage is that the rabbits can be successfully dealt with, after burning, both by poisoning and trapping. In the following spring the land should be lightly stocked to allow the grass to seed well, and so thicken the turf, for it must be remembered that the more grass there is the less the ferns will be. Light stocking checks the ferns, while overstocking assists their growth. Anyone wishing to burn a paddock should first make a good firebreak right round the land. This can best be done by ploughing a few furrows on each side of a strip of land a chain or more wide early in the spring. Any dead wood within the ploughed strips should then be burned off, before there is any danger of fires getting away. Later in the summer, say about the end of February, the strip can be burnt, or if burnt early in the year it will serve as a protection against bush fires. Then wait for a fall of rain in March and burn as soon as possible after. One very important point is that the whole of the ferny land in a paddock should be burnt, not half, or part of it, for the reason that stock are very fond of the fresh feed on the burnt land, and would eat out that part and allow feed to waste on the unburnt portion." In reply to questions, Mr. Pick said native grasses were best, because they withstood burning better. Blue grass country was not damaged by burning at the time of the year suggested in the paper. After ploughing the ferns seemed to grow more vigorously. Of course no one rule applied to the destruction of ferns in different classes of country. The Chairman said Mr. Riddoch had found that on hard ground continual cutting cleared the ferns out. Mr. Ruwoldt said that on good country cattle seemed to clear the ferns. Mr. Schlegel had noticed that in the railway enclosures, where no stock were allowed, the kangaroo grass had beaten the ferns. The grass was burned every year. Mr. J. A. Engelbrecht thought that the subject was of such importance that it would be well to pursue it further. It was decided to postpone further discussion till the next meeting, when the question would be considered in its relation to a better class of country.

Naracoorte, December 10.

(Average annual rainfall, 22 in.)

PRESENT.—Messrs. Forster (chair), Rogers, Wright, Williams, Munro, Loller, and Caldwell (Acting Sec.)

WHEAT PRIZES AT ADELAIDE SHOW.—Having discussed the conditions of entry for the Cresswell trophy, it was considered that there should be competitions at this show

for various parts of the State to place competitors on an equal footing. It was mentioned that even in the South-East the climate produced two distinct qualities of wheat—that grown in the southern and northern portions of the district. The object of the prize and the conditions and regulations were favorably spoken of.

A USEFUL CLOVER.—The Chairman showed a specimen of *Trifolium subterraneum* grown on his farm. He had sown it and it had done well, making an excellent feed for stock. It sent shoots from underneath the ground and spread very rapidly. He noticed it had spread rapidly in the mallee country on Yorke's Peninsula, and was highly prized there for stock.

Tatiara, January.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. Bond (chair), Wilson, Langley, Staude, Duncan, Low, Saxon, Milne, Steer, O'Shea, Stanton, Prescott, and Truman (Hon. Sec.).

CARE OF WHEELS.—The Hon. Secretary read the following paper on "The Care of Wheels":—All wheels with wood spokes and felloes should have a little time spent on them at this time of the year. This will save the farmer a great deal of trouble later on. It is a great mistake to tire wheels very often. Every time the wheel is tired, unless the smith is an extra careful man, the wheel dishes, and while a little dish does not hurt, a big dish ruins it. To keep wheels in good order get an old-fashioned iron pig trough without any partitions. Put into it a drum of raw linseed oil. Swing the wheel over the trough and put a fire under the latter and keep the oil hot, giving the wheel a spin round now and again for about half a day. If you have a large trough and can do two wheels at once, so much the better. If the tire is just beginning to get loose it will tighten up and you will not have it loose again for years. When tires are very loose get the wheels tired and treat them with oil, and they will not want anything done to them for years. I once treated a pair of spring cart wheels in this way. Both tires were loose and could be pulled off with the hand. These wheels were treated every day for about a week in oil. They tightened up and were used every day for years and never came loose again. A drum of oil costing about 24s. would do a set of wagon wheels and a set of buggy wheels, and set them up for years. A farmer can also fix his own light tires by placing hoop iron between the tires and the rim. If the wheel is felloe bound place rings of leather on the spokes under the rim. The jennests must be wedged. Do this by pulling the tire on one side to get at the spokes. Do not run wheels when they rattle. My experience with wheels in the Tatiara is that the tire should never be extra tight, but just snug, for if we have them tight the water swells up the wood and the wheel becomes like a saucer; but if they are saturated with oil the water will never affect them. Mr. Low agreed with every particular in the paper.

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

The Director of Agriculture.

The new Director of Agriculture (Mr. W. Lowrie, M.A., B.Sc.) took up his duties on March 1st, and in the early part of the month presided over the inter-State conference on dry farming. He is now occupied in informing himself as to the position of the department, so as to be prepared to co-ordinate the work of the different officers with a view to avoid overlapping, and to promote generally the interests of the agricultural industry, which he recognises has made marked progress during the last 10 years. It must be gratifying to an officer, coming back after that lapse of time, to know that the lands of the State are yielding higher averages than were reaped even in the pioneer days of settlement. This is the best evidence that the land has not been exhausted, but that the main end of the farmer—the maintenance of fertility—has been constantly kept in view, and that the traditional aim of the best men on the land, namely, to leave their farms of a higher capacity than they found them, has been secured.

Lands Open for Selection.

About 33,000 acres of lands repurchased from the Struan Estate are gazetted as open for application. These lands are near Naracoorte; and there are also 9,850 acres of University lands to be opened shortly between Wolsley and Custon. The survey of the North Booborowie Estate, containing over 33,000 acres, will soon enable that land to be gazetted. The survey of about 186,000 acres in the hundreds of Hooper and Marmon Jabuk is almost completed, and they will be ready for application at an early date. They are situated near the railway surveyed between Tailm Bend and Brown's Well, and they begin about 18 miles from the former place. In the hundred of Pendleton about 20,000 acres, between Keith and Wirrega, will soon be available.

Dry Farming Conference of Inter-State Representatives.

A Conference of officers of the Departments of Agriculture in several of the Australian States, together with representative farmers from each, was held in Adelaide on March 6th and 7th, to discuss matters in connection with the cultivation of land under a limited rainfall. The following is a list of delegates :—Queensland—Mr. Godfrey Morgan, M.L.A.; Mr. Wm. Soutter,

Manager Roma State Farm. New South Wales—Mr. H. C. L. Anderson, M. A., Under Secretary, Department of Agriculture; Mr. G. Sutton, Wheat Experimentalist; Mr. R. W. Peacock, Manager Bathurst Experimental Farm; Mr. Thos. Bragg; Mr. Geo. Lindon; Mr. M. J. D'Arcy; Mr. Edward Crouch. Victoria—Dr. S. S. Cameron, M.R.C.V.S., Director of Agriculture; Senator McColl; Mr. R. Standley, M.L.A. South Australia—Professor W. Lowrie, M.A., B.Sc., Director of Agriculture; Professor A. J. Perkins, Principal Roseworthy Agricultural College; Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S., Superintendent of Agriculture for South-East; Mr. A. E. V. Richardson, M.A., B.Sc. (Agric.), Assistant Director of Agriculture; Mr. W. L. Summers, Acting Secretary Minister of Agriculture; Hon. T. Pascoe, M.L.C.; Mr. C. E. Birks; Mr. A. J. A. Koch. The Conference was opened by the Hon. J. P. Wilson, M.L.C., Minister of Agriculture; Professor Lowrie was elected Chairman of the conference. Keen interest and animated debates marked the proceedings throughout. It was decided to request the Ministers of Agriculture throughout the Commonwealth to regard the fixture as an annual event, and to convene the Conference in the different States from year to year.

The Late Mr. Joseph King.

Mr. Joseph King, the originator of King's Early wheat, died at his residence Aylesbury Farm, near Gladstone, on February 6th. The deceased gentleman was an enterprising and progressive farmer, and did good work in developing rust-resisting wheats. He was for many years an active member of the Agricultural Bureau and chairman of the Georgetown District Council. A few years ago he was one of the best rifle shots in the State, and was a member of the team who for seven years held the championship of the South Australian National Rifle Association, winning the Sir E. T. Smith shield in 1891 and the Challenge Trophy three years later, when all the members of the team received gold medals.

Agricultural Bureau Conferences.

For some time past the members of the Branches of the Agricultural Bureau situated on Eyre's Peninsula have wished to arrange for a local Conference. It has now been decided to meet at Tumby Bay on Saturday, March 25th, and it is hoped that delegates will attend from Branches all round the district. The arrangements are in the hands of the Lipson Branch, and papers will be read by representatives of several West Coast Branches. The Department will be represented by Mr. A. E. V. Richardson, M.A., B.Sc. (Assistant Director of Agriculture) and Mr. J. F. McEachran, M.R.C.V.S.

(Government Veterinary Surgeon), who will address the meeting. The annual Conference of the South-East Branches will be held at Naracoorte on March 29th. The Naracoorte Branch is making all arrangements for papers to be read and addresses delivered. The Conference will be opened by the Hon. J. P. Wilson, M.L.C. (Minister of Agriculture), and the Department will be represented by several members of the staff, who will deliver addresses.

The World's Wool.

The following figures show the wool clip of the principal producing countries of the world :—

	Lbs.	Per cent.
1. Australia	642,185,000	.. 23·4
2. Russian Empire	380,000,000	.. 13·8
3. Argentine	328,731,000	.. 11·9
4. United States	298,915,000	.. 10·9
5. New Zealand	200,547,000	.. 7·3
6. United Kingdom	133,088,000	.. 4·8
7. All other	769,119,000	.. 27·9
	2,752,585,000	.. 100·0

Wheat Trade with Bristol.

Major A. E. M. Norton, D.S.O., forwards by the last mail reports of a recent visit to Bristol, where he was entertained by the Lord Mayor at the Grand Hotel in the presence of the most influential and leading business men of Bristol. During the discussion which followed the official welcome, Mr. Sidney Humphries, one of the leading flourmillers in that part of England, raised a point as to freights. Mr. Bethell said they were identical in London, Liverpool, and Bristol. Mr. Holman pressed on Major Norton the importance of sending wheat to the port, where 3 per cent. better return could be obtained than by shipping to London or Liverpool. Bristol had a very large area of distribution, up to Wolverhampton and Leicester, the whole of the West of England, and South Wales, and could take 2,000 to 3,000 tons of South Australian wheat from January to December—perhaps even 4,000 tons; so that if steamers wanted anything to complete their cargoes for Bristol here was a chance. No encouragement had ever been given to the Bristol corn trade by shipowners sending ships from Australia, whereas he was sure that the prices obtained in London were 2 per cent. lower than could be obtained by direct shipment to Bristol. Mr. Humphries spoke of the

requirements of millers, and said they paid for quality in wheat. Major Norton promised to make representations on both these points. Shipowners told him they would always go where they could get cargoes. Might he tell South Australian farmers that they would get better prices for the higher grade wheats? Mr. Humphries—"Certainly."

The Phylloxera Board.

At a meeting of the Phylloxera Board held on March 3rd prominence was given to the necessity of taking more active steps to prevent the introduction of plant life across the border and down the river, especially as reports had been received of fruit trees and vines having been introduced over the border into Pinnaroo. Fortunately the reports to hand from Chief Inspector Lowcay and Sub-Inspector Gillard show that there is no phylloxera present in South Australia, although there is a considerable amount of oidium, owing to the cool and moist season which has been experienced. It was also resolved to request that a stricter supervision be exercised by the sub-inspectors on the South-Eastern border.

Two Standards for Wheat.

Some of the prize-winning samples of wheat at the last show of the Royal Agricultural Society of New South Wales were sent to the Agent-General of that State for exhibition in England. Mr. Coghlan reports that experts at Liverpool judged the grain to be of prime quality, and many of the millers expressed the belief that if Australian growers would make a special feature of such varieties as Bobs, Jade, and Bunyip, a considerable improvement would be immediately noticeable in the price obtained in Great Britain. The variety Medeah was lighter than the others, and the opinion was expressed that it would realise less per bushel. Mr. Vernon, Vice-President of the Liverpool Corn Trade Association, and one of the leading millers in England, urges in the interest of New South Wales growers that two standards be adopted, as a large quantity of prime wheat is sold which is superior to the f.a.q. standard.—*Agricultural Gazette of New South Wales*.

Quickening the Growth of Wheat.

According to the London *Daily Mirror*, Mr. J. J. Melville, a scientist who has been making experiments on the vitality of seeds for the past three years, has discovered a new process for accelerating the growth of wheat. It is claimed that by this process, which affects the germ of the wheat and of

other seed, the life force of the seed is trebled, and that it is possible to get two crops a year off the land. The process is a secret, at any rate for the present. The *Daily Mirror's* correspondent at Burnham-on-Crouch describes a striking experiment which has been made, as follows :—" I have to-day seen a field of wheat here which is in effect a revolution, for it is the quickest crop that ever grew in England. This wheat was sown on July 19th of this year, and it will be ready to reap in about a fortnight. To-day it is in full ear, only $11\frac{1}{2}$ weeks after it was planted. It has caught up the ordinary wheat sown in spring. In the ordinary way 18 weeks elapse from the time wheat is planted till it is ready for reaping. Under this system the period will, it is believed, be reduced to nine weeks."

The Standard Bushel.

The weight of the standard bushel for the season 1910-11 for Victoria was fixed on March 6th at $62\frac{1}{2}$ lbs. The New South Wales standard bushel was fixed some days previously at $62\frac{1}{2}$ lbs., the same weight as in South Australia and Western Australia. The f.a.q. standard for the four principal wheat-growing States since 1898-9 is as follows :—

Year.	South Australia.		Victoria.		New South Wales.		Western Australia.
	Lbs.		Lbs.		Lbs.		Lbs.
1898-99.....	63	..	$62\frac{1}{2}$	..	61	..	—
1899-1900.....	63	..	$62\frac{1}{2}$	..	61	..	—
1900-1.....	63	..	$62\frac{1}{2}$	..	61	..	—
1901-2.....	62	..	$62\frac{1}{2}$	..	$61\frac{1}{2}$	..	—
1902-3.....	63	..	61	..	—	..	—
1903-4.....	$61\frac{1}{2}$	..	$60\frac{1}{2}$	..	61	..	—
1904-5.....	63	..	$61\frac{1}{2}$	..	$59\frac{1}{2}$	..	—
1905-6.....	63	..	63	..	62	..	—
1906-7.....	$62\frac{1}{2}$	..	$62\frac{3}{4}$	..	$62\frac{1}{4}$	..	—
1907-8.....	63	..	$62\frac{1}{2}$	..	$62\frac{1}{2}$	..	—
1908-9.....	$62\frac{1}{2}$	..	$62\frac{1}{2}$	..	$61\frac{1}{2}$	..	62
1909-10.....	$62\frac{1}{2}$	..	$62\frac{1}{2}$	..	62	..	62
1910-11.....	$62\frac{1}{2}$	..	$62\frac{1}{4}$	..	$62\frac{1}{2}$	..	$62\frac{1}{4}$
Average	62.65	..	62.20	..	61.48	..	62.16

Propagating Grape Vines.

The Horticultural Instructor (Mr. G. Quinn) writes—"Inquiries have been made for particulars respecting methods of propagating the grape vine other than those of striking cuttings and grafting by means of the ordinary split or cleft grafts. I have succeeded in budding grape vines by adopting the

ordinary method of shield-budding and wrapping the inserted buds around with narrow strips of waxed calico instead of budding cotton. The buds, which were extremely plump, were cut from the current year's growth and inserted into a cane which was fresh and sappy. The variety operated on was Zante currant for the stock, and the buds were taken from Centennial. The two varieties represent probably the smallest black grape in the case of the stock and the largest white grape in the case of the bud. Although these varieties are extremely diverse in character they have united well. The vines from these buds are now eight or nine years old, and have grown and fruited well, showing no want of affinity at the point of union."

Cultivation an Insurance against Drought.

There is no reason why farmers should permit themselves to suffer from periods of drought. It is their own fault if they do not guard against them to the fullest extent. For instance, take a field of corn which has started off well in June with an abundance of moisture in the ground, and during the ordinary season of early growth prior to July 1st there has been the usual rainfall. If the farmer has so cultivated the soil that there has been no waste of moisture the soil will be in good condition down several feet. If he has covered the surface with a mulch of dirt it will not be possible, with the shade furnished by the growing plants, to ruin such a crop even if no further rains fall until the ears are filled. Here comes in the value of scientific tillage, not only for crops that admit cultivation like corn and potatoes, but also for other crops like wheat and barley and for fruit of all kinds. The greatest evils of droughts are due to ignorant treatment of the soil. It is because the soil is not put into the best condition that it is unable to withstand the droughts that come. The more scientific has been the preparation of the seed bed and the greater care in the cultivation of the crop the greater will be the drought-resistant character of the crop. And all this preparation for the worst is very valuable for the best conditions.—*Campbell's Scientific Farmer.*

A Parasitic Weed.

Professor Ewart (Government Botanist of Victoria) has been making experiments for the suppression of common *Bartsia* (*Bartsia latifolia*), a pretty little red-flowered weed which is as common in South Australia as in the adjoining State. Incidentally Mr. Ewart has established the important fact that the roots of this species are parasitic on grass roots, to which they attach themselves by means of little lateral suckers. This accounts for the bad effect which the *Bartsia* has on pasture by gradually killing out the grasses. The experiments showed that poisons were useless, as they injured

the grass more than the *Bartsia*; and other trials with chemical manure, in the hope of stimulating the grass without the weed, were also unsatisfactory, as the *Bartsia* remained very numerous. "It is quite evident from the above results," says Professor Ewart, "that the most effective way of eradicating *Bartsia* from an affected pasture will be by bringing it under temporary cultivation. The manure used, if free from weed seeds, and the working of the soil during cultivation, will leave the ground in far better heart to produce a strong, luxuriant pasture than it was before, and at the same time will reduce the parasitic *Bartsia* almost to vanishing point. This is of considerable importance, because a pasture badly infested with this weed must ultimately be ruined as the parasite destroys the grass." Common *Bartsia* is an annual plant with an erect stem 3in. to 6in. high, on which the broad and toothed leaves are placed opposite to each other; the flowers are numerous near the top of the stem, reddish, and with two yellow spots on the lower lip. Very rarely the flowers are all white. It is common in pasture near Adelaide, and has extended inland to distant runs. Originally it came from the Mediterranean region, and is propagated by its very numerous small seeds.

Imports and Exports of Fruits.

During the month of February 7,512bush. of fresh fruits, 1,246 bags of potatoes, 46 bags of onions, and 51pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 368bush. of bananas (chiefly over-ripe) were destroyed. At Serviceton 88bush. of fresh fruits were admitted. The exports to inter-State markets examined and passed at Adelaide and Port Adelaide comprised 9,265bush. of fresh fruits, 3,795pkgs. of vegetables. In addition 221bush. of fresh fruits were certified for export at Gawler, 48bush. at Laura, 1,011bush. at Clare, 3bush. at Salisbury, 107bush. at Stirling North, 2bush. and 34bags of potatoes at Stirling West, 305bush. at Coonawarra, and 181bush. at Wirrabara. Under the Federal Commerce Act 2,937 cases of fresh fruits, 1,400pkgs. of dried fruits, 119pkgs. of preserved fruit, and 350 cases of honey were exported to oversea markets during the same period. These were distributed as follows:—For London, 838 cases apples, 251 cases pears, 100 cases preserved fruit, 1,270 cases dried fruit, and 250 cases honey; for Germany, 100 cases honey; for New Zealand, 119pkgs. dried fruit; for India and East, 1,823 cases apples, 25 cases pears, 19pkgs. preserved fruit, and 12pkgs. dried fruits. Under the Federal Quarantine Act, 1,475pkgs. of plants, seeds, bulbs, &c., were admitted from oversea sources.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

MANGE IN BULLOCKS.

"Mount Bryan East" writes—"I wish to know the name, cause, and cure of scabby patches from 3in. to 9in. in diameter, which assume an appearance like bran, occurring on bullocks in good condition. The patches disappear on their own account after three or four months."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"The skin complaint in bullocks is apparently a form of mange, caused by acari. Affected parts should be washed well with soap and hot water, dried; then the following application should be rubbed in, viz., sulphur, 4ozs.; oil of tar, 6ozs.; raw linseed oil, 8ozs. Mix. Leave on for three days, wash off, dry, and re-apply. Two applications usually suffice."

TICK IN POULTRY.

"Goodwood" writes complaining that her pullets are dying, apparently of diarrhoea.

The Poultry Expert (Mr. D. F. Laurie) replies—"Investigation proves that the premises are infested with tick and that the immediate cause of death is blood poisoning (*spirochaetosis*) caused by the bite of the tick. Many people do not know what a poultry tick is like. Very few take the trouble to eradicate the pest. This is, however, required by law."

SWOLLEN LEGS IN FOWLS.

"T. B.," Moonta, writes that the legs of his fowls are swollen, and asks for a remedy.

The Poultry Expert (Mr. D. F. Laurie) replies—"Fowls are sometimes affected with *elephantiasis*, which causes considerable swelling. Very little can be done to help such cases, although an ointment compounded as follows, if rubbed in daily, may give good results:—Whale oil, 2ozs.; sulphur, 1oz.; oxide of zinc, ½oz.; oil of tar, 1 drachm. Again, the trouble may be due to chronic rheumatism, which often ends in death. Treatment as follows may

be recommended :—Give a dose of 20 grains to 30 grains of Epsom salts dissolved in warm water. The following day to each quart of drinking water add 40 grains bicarbonate of soda (baking soda), and give of salicylic acid 2 grains to 3 grains twice a day."

LIME AND SORREL.

"D. L.," Geranium, asks what is the best and most economical way of supplying lime to the land, and also the best way to kill sorrel.

The Director of Agriculture (Mr. W. Lowrie, M.A., B.Sc.) recommends that quicklime be applied, at the rate of 5cwts. to 7cwts. per acre, with the ordinary fertiliser attachment of the drill. It is a great advantage in the application of lime to be able to distribute it through the drill, and a few shillings' extra cost per ton is more than compensated by the better distribution and the convenience of working. If the soil be in a wet district, with abundance of organic matter, ground limestone may suffice; but in most cases the modern practice is to supply ground quicklime, at the rate of a few hundredweights per acre, instead of the old plan of applying lime in tons and spreading it with a shovel. A lighter dressing on land that requires lime means more frequent applications. The best time for the application is in autumn, shortly before seeding. As regards sorrel, there is no expeditious way of killing it: this must be done by prolonged working in dry weather. Sheep on the farm help to keep sorrel down, if it be not present in excess, but instances occur now and again, when paddocks are infested with the weed, of sheep injuring themselves by eating it too greedily. The lime will help to keep down the sorrel, which seems to thrive best on land sour and deficient in lime.

CURCULIO BEETLE.

"F. C. K.," Penwortham, writes for information with respect to the best way of dealing with the Curculio beetle.

The Horticultural Instructor (Mr. G. Quinn) replies—"If the sheepskin band is to remain an effective check to the ascent of the curculio beetle it must be placed in such a position that the wool does not become matted by exposure to rain; otherwise the insects will simply crawl over the surface and ascend the tree. I have secured very good results with nursery stock by spraying with Swift's lead arsenate, 1lb. in 8galls. of water. This treatment must be repeated from time to time, as the trees put out new growth. If you use the mixture of lead arsenate which you mention as being made from white arsenic dissolved with washing soda and blended with acetate of lead, I would strongly advise you to mix some freshly made limewater with it prior to spraying the mixture upon the trees. One pound of new lime should give you enough for 40galls. of spray. If you do not add this limewater I am very much afraid that you will burn the foliage of your plants."

GUM ON ALMOND TREES.

A correspondent writes asking what is the cause of large masses of gum, mixed with sawdust, exuding from the stems of his almond trees.

The Horticultural Instructor (Mr. G. Quinn) replies—"The exudation of gum from the trunks of almond trees is known to be due to constriction, or injury inflicted on the sap cells, which has interfered with the proper circulation of the sap. Some of the common causes are—(1) unsuitable stocks, that is, lack of affinity between stock and scion, or the root portion is unable to remain healthy and thrive in the particular class of soil in which it is planted; (2) wound caused by a blow or twist due to the effects of wind storms; (3) malnutrition owing to the trees being set in unfavorable soils. When once the gum starts to exude from any portion of the stem, that spot is frequented by moths, which deposit their eggs there. The resulting caterpillars burrow into the tree and cause the sawdust-like excrement which is found mixed with the gum. The well-known Brandis variety is particularly subject to this defect, while Hatcher's Nonpareil appears to be much less troubled with it. Sometimes by scraping away the gummy exudation and damaged tissue, and painting the wounded sections with Stockholm tar, the evil may be mitigated, but no permanent cure is assured. The almond requires to be planted in well-drained soil, and prefers that soil in which there is a fairly high percentage of lime present."

SULPHURING OF DRIED FRUIT.

"A. L.," Willunga, writes asking for information with respect to the new regulations under the Food and Drugs Act relating to the sulphuring of dried fruit.

The Horticultural Instructor (Mr. G. Quinn) replies—"I have had a consultation with the Government Analyst, who informs me that the regulations made under the Food and Drugs Act set forth the quantities of natural sulphur which are permitted in dried fruit. In respect to apricots the quantity of sulphurous acid allowed is .015 per cent. The replies to my inquiries of the Government Analyst, who is a member of the Food and Drugs Board, do not give any indication that the regulations will be placed in abeyance until further experiments are made. This, I believe, was asked for by the Renmark fruitgrowers, but the amount of sulphur stipulated in the regulations only refers to natural sulphur which may possibly be contained in the fruit itself. This quantity, however, viz., .015 per cent., is in excess of what is likely to be found in fruit, but it is set up as a basis, and all sulphur above this quantity will be called added sulphur. The Government Analyst informs me that there is nothing to prevent sulphuring of fruit; but the packages of dried fruit must have branded upon them the amount of added sulphur contained

in the fruit. This would necessitate the obtaining of an analyst's determination of a sample of each drier's produce, and the result could then be stamped on the cases, and the retailer might in turn copy this statement on to his smaller packages."

STRAWBERRY CULTURE.

"Strawberry" writes asking if any publications dealing with the growing of strawberries are procurable in this State.

The Horticultural Instructor (Mr. G. Quinn) replies—"As no publications are available, the following brief outline of strawberry culture may be useful. The most suitable soil for the strawberry is a fairly light loam overlying a good retentive clay subsoil. The ground should be trenched at least a foot in depth, keeping the clay in its natural position. A good dressing of, say, 5cwts. of bonedust or 10 tons of well-rotted stable manure per acre should be worked into the soil at the time of preparation. June is considered to be the best month to set out the plants here, there being an advantage in planting during rainy weather, provided the soil is not too boggy. The young off-sets from the runners which are well rooted make the best plants. They should be set out about 15in. apart in the rows, which may be anywhere to 2ft. and upwards distant from each other. The plants should not be set deeply in the soil, but the crown of the roots ought to lie just on a level with the surface. The soil between the rows should be kept stirred with a hoe, and care taken not to stir deeply immediately adjoining the plants, because they make a considerable number of surface roots as the spring advances. At this period a light dressing of superphosphate, say 1½cwt. per acre, should be sprinkled around the plants and gently chopped in with a hoe. There is an advantage in mulching them with old stable litter, manure, seaweed, or short straw, according as one or the other may be available, for, being surface-rooters, the soil must be kept cool and moist. The most suitable varieties grown here are La Marguerite, Royal Sovereign, Sir Joseph Paxton, Madame Melba, Arthur, Christy's Edith, and White Chilian.

TREATING BARLEY FOR SMUT.

"Bailey-grower" writes—"What should be the temperature when treating barley with hot water for smut, and how long does it require to be immersed?"

The Assistant Director of Agriculture (Mr. A. E. V. Richardson, M.A., B.Sc.) replies—"The barley should be immersed in hot water at a constant temperature of 132° F. for five minutes. The constancy of the temperature is a very important point, and provision must be made for the lowering of the temperature which takes place when the grain is first immersed."

GOVERNMENT EXPERIMENTAL FARMS, 1910.

By A. E. V. RICHARDSON, M.A., B.Sc. (Agric.).

I.—PARAFIELD.

Good progress has been made in the work of wheat improvement and in the production of high-grade seed wheat. The area devoted to this undertaking has been considerably increased by the acquisition of portion of the Turretfield Estate and by the purchase of a block of land adjoining the Parafield Farm.

DEMAND FOR SEED WHEAT.

The special work of this farm consists in (a) the production of new varieties of wheat by cross-breeding and selection; (b) the production of graded seed wheat for distribution. So far as the latter purpose is concerned, it may be mentioned that the whole of the seed wheat available for distribution this season was applied for many times over before the end of January, and large bookings have already been made for seed wheat from next season's crop. It is satisfactory to note that most of the primary producers are keenly alive to the value of pure-graded seed wheat; and, provided a good supply of seed could be maintained at reasonable prices, it is certain that a large number of farmers would annually make use of the graded seed produced on the Government experimental farms. It is hoped during the coming season, through the medium of the Parafield, Shannon, Loxton, Veitch's Well, and Minburra Experimental Farms, that the department may be able to distribute large quantities of seed wheat among the farmers in the neighborhood of these properties.

(1)—BREEDING PLOTS.

In the work of wheat improvement the operations for the first three years must necessarily be done by hand. The first essential is to secure a reliable collection of standard wheats, from which suitable plants may be selected for cross-breeding. For this purpose the best of all the local varieties have been sown, and a collection of the standard wheats from the Departments of Agriculture in India, Russia, Canada, United States, and the Argentine have been obtained. Many of the latter wheats yield at first most disappointing results, but we have noticed that in most instances the annual yields progressively increase towards a maximum. With the fourth season the foreign wheats appear to become quite acclimatised. It is questionable, however, whether we are likely to gain much directly by the importation of

these wheats. In many instances, so far, the best of the foreign wheats are not so prolific under Australian skies as what we might term our native wheats. There are, however, a few of these introduced wheats which, on acclimatisation, have equalled the Australian wheats. For example, American No. 8, a wheat of beautiful milling quality, has done well in competition with our standard wheats. In the experimental plots last season, with Wright & Roberts, at Pinnaroo, American No. 8 gave a return of 31½ bush., as against 27 bush. from Yandilla King and 25 bush. from Federation, the next highest on the list. Indirectly, though, these wheats have been of the utmost use, inasmuch as many of them possess qualities which are likely to be of great service in cross-breeding. The Indian wheats have been found to be remarkably early, as a class, and are therefore likely to become of especial value in raising varieties of exceptional earliness. Not only are they early, but they have been proved to impart this earliness to crossbred offspring, and in a remarkable degree. Some Indian crosses on Federation and Bobs have been found to be 16 to 20 days earlier than the varieties on which the crossing was performed.

The raising of early varieties of wheat is likely to prove of considerable importance. During the past few years we have not felt the necessity for early

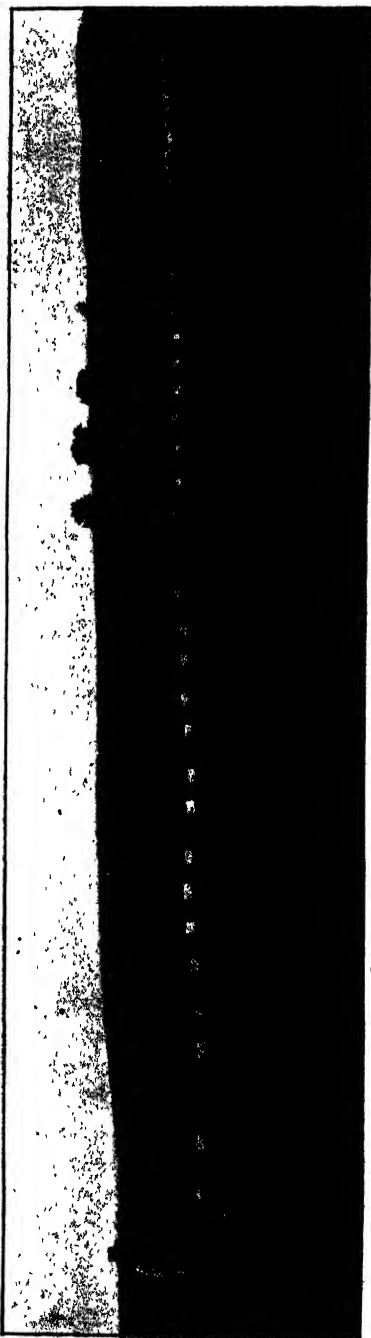


Fig. 1.—A Few of the Breeding Plots.

wheats, for the seasons have been characterised by late rains and an abnormal precipitation. This is exemplified by the success of such late varieties as Yandilla King and Marshall's No. 3 in departmental tests. With a return to more normal seasons it will be imperative, for the Northern farmers at least, to utilise those varieties which mature quickly, and which, in rusty seasons, are most likely to escape the ravages of that disease; consequently, if the important combination of quality, prolificacy, and comparative rust resistance can be secured, the labor spent on such a production will not be in excess of the reward. Some of the Canadian and Russian varieties contain in the highest degree the special qualities necessary for the production of high-class flour. Unfortunately, yields of these varieties have not been so high as might be expected; still there can be no question regarding their



Fig. II.—Crossbred Plots of the Second Generation, Parafield.

value in improving the quality of our standard wheats. South Australia has always been able to produce a wheat of excellent color; but we cannot overlook the fact that our wheats are notoriously low in gluten, and, as a whole, deficient in strength. It may be that these deficiencies are a characteristic of climate, and, if so, we might be inclined to infer that improvement in these respects is beyond the limits of possibility. While admitting, however, that these important qualities are in a large measure dependent on the climate, we have reason to believe that properties of high gluten content and strength can be greatly improved by cross-breeding. Crosses with Manitoban and Russian wheats have given progeny with high gluten content and strength. Whether these properties can be retained by selection, or whether they will gradually fall to the level of our ordinary wheats, can

only be determined by testing the milling properties of the progeny through several generations.

(2)—CROSSBRED PLOTS.

The production of crossbred varieties is simplicity itself; the fixation of prolific and useful varieties is a tedious and laborious process. We need not enter into technical details of the work at this stage, but a few observations of an elementary and explanatory character will not be out of place. Last season there were three generations of crossbred plots, representing the crosses made in 1907, 1908, and 1909.

First Generation Crosses (1909).—These comprised the crosses made in 1909, and consisted of selected Canadian hard reds, Indian and Hungarian varieties on Federation, Gluyas, Yandilla King, Viking, Jonathan, and King's

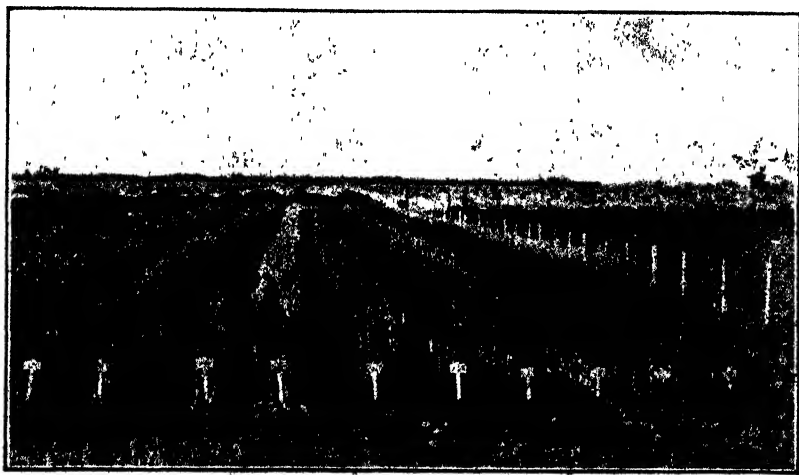


Fig. III.—Crossbred Plots of the Third Generation, Parafield.

Early and other local wheats. As a general characteristic we have observed that the crossbred progeny of the first generation is generally intermediate in character to its parents.

Second Generation (1908).—In this generation the "sporting" characteristics of the crossbred are plainly observed. Every conceivable gradation of type occurs between the male plant on the one hand and the female on the other. Moreover, characters appear in the second generation which are either obscured in or latent in either parent. Well might we call this generation the "variable" generation of the crossbreds, for its sporting proclivity reaches a maximum. And it is here that the wheat-improver has his great opportunity. He has a multiplicity of types from his single cross, and he has now to select and fix just those which are likely to be of some special value on account of the possession of special properties. Crosses of this

generation of particular interest at Parafield last season were Clubhead x Yandilla King, Clubhead x Federation, Indian 19 x Jonathan, Indian 19 x Federation, Preston (Canadian) x Gluyas, Indian x Comeback, Medeah x Gallant, Stanley x Gamma. All of these show promise of developing into varieties of special value for South Australian conditions. The great temptation of the breeder at this stage of the work is to retain too many types. Certainly it is wise to give each promising type a further trial before finally discarding it, but too much leniency shown in selecting types from the second generation will mean the handling of a vast number of crosses in later generations.

[*Third Generation* (1907).—Fifty-seven of these were sown in long drills

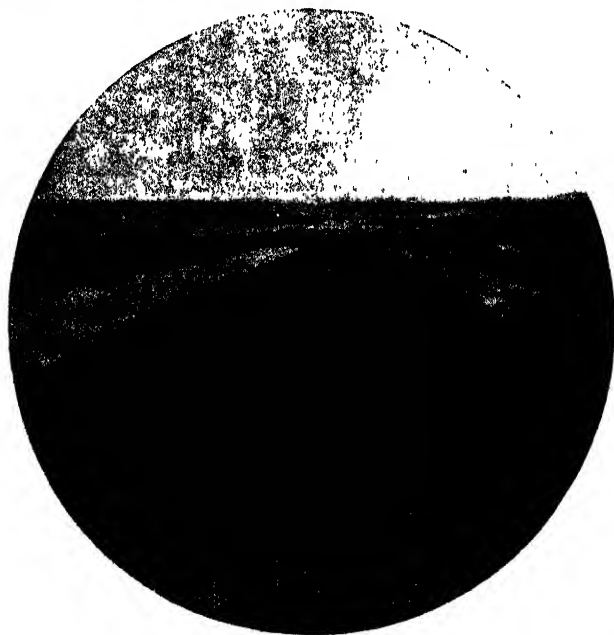


Fig. IV.—A Glimpse of the Seed Wheat Plots at Parafield.

last season, and, while the majority will be discarded this season, there are quite a number of worthy types.

The work of cross-breeding and selection will be of little avail if we cannot produce varieties superior to those in general cultivation to-day, and whenever types are formed among the third generation which are not likely to displace the best of the general use to-day, it is of little use to continue their cultivation. Among these third generation crosses Indian F. x Federation, Clubhead x Yandilla King, Bobs x Yandilla King, Indian H. x Comeback, Thew x Yandilla King, Clubhead x Comeback, Bobs x Federation, Stanley x Dart's Imperial are worthy of special mention, either on account

of the possession of specially early maturing qualities, prolificacy, or milling quality.

(3)—SEED WHEAT PLOTS.

Twenty-three varieties of wheat were sown in plots from half up to four and a quarter acres each on fallow land. Special care had been taken with most of these wheats during the two preceding years to carefully obtain each variety as true to type and pure as possible. The plots were sown with a mixture of 70lbs. bone manure per acre and 70lbs. superphosphate, and were

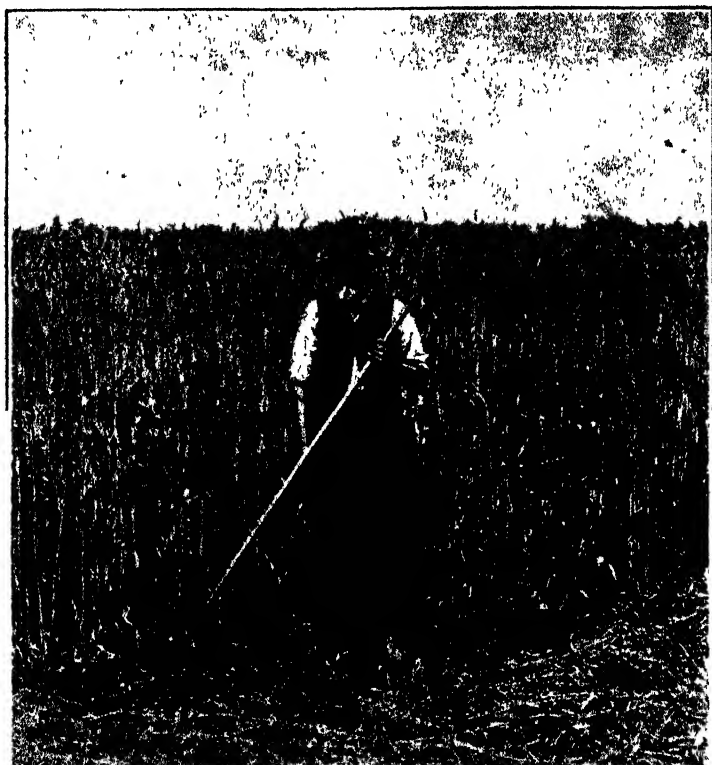


Fig. V.—A Heavy Crop of Le Huguenot at Parafield.

all pickled with a solution of formalin, 1lb. to 50galls. of water. No bunt (*Tilletia tritici*) was observed in any of the plots, but loose smut (*Ustilago tritici*) was frequently observed before harvest in King's Early and Bunyip, and flag smut in Federation and particularly in Firbank.

Rust was present in nearly all the plots, and seriously interfered with the yield of Firbank and Cumberland. Strangely enough Cumberland completely escaped the rust at Loxton and Veitch's Well, while the other varieties were rather badly attacked by the disease. Finally "takeall" (*Ophiobolus*

graminis) was very prevalent during the season, and it was particularly serious in the Bunyip, American No. 8, Federation (No. 1 plot), and Cedar. The land was fallowed early and worked only when in good physical condition, and the seed bed was mellow and well consolidated. Moreover, the takeall appeared in land that had been lying out for nearly 20 years. The season generally was favorable to growth, but heavy and continued rains in May, June, and July (10½ in.) prevented high yields being obtained. This can be readily understood when it is remembered that the soil is a heavy clay resting on a subsoil of a similar character.



Fig. VI.—Medeah, averaging 6ft. high.

For two months the whole of the farm was more or less waterlogged. Each of these seed wheat plots was treated uniformly, and they all started off with equal opportunities, so that the actual yields are a fair criterion of their value in a district like Salisbury under conditions similar to those which obtained during 1910. Three Federation plots were sown in various parts of the farm to serve as check plots on the yields of the other varieties. If a wide variation in the yields of these three plots was observed

it would indicate that the conditions on the various fields varied considerably. However, the plots were practically the same in yield, namely, 34bush. 3lbs., 33bush. 10lbs., 32bush. 8lbs. This latter plot suffered slightly in yield from the fact that it was sown alongside a row of sugar gum and pine trees.

The following table summarises the yields :—

	Bush.	Lbs.
1. Bayah (N.S.W.)	35	44
2. Selected Federation (No. 1 plot)	33	3
3. Selected Federation (No. 2 plot)	33	10
4. Selected Federation (No. 3 plot)	32	8
5. Yandilla King	28	58
6. Correll's No. 7	28	16
7. Crossbred No. 28	27	42
8. Genoa (N.S.W.)	26	30
9. White Tuscan	25	44
10. Triumph	22	54
11. Thew (N.S.W.)	22	36
12. American No. 8	22	30
13. Marshall's No. 3	22	29
14. Firbank (N.S.W.)	20	47
15. Comeback	20	1
16. Bunyip	18	26
17. Crossbred No. 53 (W.A.)	17	57
18. Cumberland	17	50
19. Medeah	15	53
20. Huguenot	15	46
21. Cedar	15	19
22. Gluyas	9	8

A few remarks need to be added in justification of some of those varieties low down on the list. Firbank suffered rather badly from rust and flag smut, Cumberland from rust, Bunyip and Cedar from a bad attack of takeall. Gluyas went down rather badly with the gales in October, and only portion of the crop could be recovered. Medeah and Huguenot gave an astonishing growth of straw, but yielded very little grain. These varieties are, of course, usually grown for green fodder or hay. The average yield of the whole farm was 25bush. 40lbs.

II.—LOXTON AND VEITCH'S WELL.

The Loxton Experimental Farm consists of, approximately, 600 acres of land situated on the banks of the River Murray. Several years ago small experimental plots were established in conjunction with the Loxton Experi-

mental Farm at Veitch's Well, 17 miles from the river frontage, and Schell's Well, 35 miles from Loxton. These were situated in the midst of a vast area of unsurveyed mallee scrub; and, inasmuch as a series of sandhills had to be negotiated to cultivate the plots, the work had to be carried out under very trying conditions. Last year an area of 4,000 acres of unsurveyed scrub at Veitch's Well had been handed over to the Agricultural Department for experimental purposes, and it was resolved to make Veitch's Well the headquarters of the departmental activity in the Loxton district. The results for the first year's operations will therefore be read with interest; and, if the promising yields obtained at the Veitch's Well Experimental Farm may be regarded as a fair indication of the capacity of the district, it is certain that the opening up of new hundreds along the proposed line of railway will add materially to the wealth of the State. At the Veitch's Well Farm 100 acres were cut for hay this year, and averaged slightly over 1 ton per acre; 3,159bush. of wheat were gathered from $197\frac{1}{2}$ acres, or an average of 16bush. per acre; and 88bush. of oats were stripped from eight acres, averaging 11bush. per acre. The greater part of these were situated on scrub land cleared only a few months before seeding. On the Loxton Experimental Farm 30 acres of hay yielded 46 tons, or 1.53 tons per acre; $97\frac{1}{2}$ acres of wheat yielded 1,528bush., or $15\frac{3}{4}$ bush. per acre, while $10\frac{1}{2}$ bush. of oats were reaped per acre. In scrub country like that of Veitch's Well there are many important agricultural problems to solve, and the solution of these problems can only be obtained by definite and systematic experimental work. In the older portions of the country there is usually an inherited mass of farming tradition to guide the agricultural practices of the district. In scrub country like that of Loxton there is usually nothing to guide the agricultural practices of the district, save the trying experiences of the pioneers. This experience is certainly of some value to the later settler; but, inasmuch as it is rarely the outcome of a definite preconceived scheme of experimental work, the experience is frequently of minor value. And this serves to indicate the wisdom of establishing experimental farms in certain selected districts; for such farms can do what most private individuals are not able or do not care to do, namely, settle what practices are best suited to the district by a careful set of long-continued experiments. Experiments, to have any value at all, must extend over a long period of time, or else incidental and abnormal factors distort the results obtained. The results of these experiments must not be regarded as conclusive, but merely a beginning which future experience will either modify or confirm. A new settler, unfamiliar with the land he is destined to work, not only seeks information as to the most profitable amount of seed to sow per acre, but what kind of manure should be used for the most economical results, and in what quantities this manure should be applied. Another pressing question is the kind of cultivation best suited for his conditions, and the varieties of seed most likely to prove profitable.

A start has been made to solve these problems at Veitch's Well. The following tables summarise the results :—

TABLE I.—*Variety Test.*

Variety.	Date Sown.	Seed Sown. lbs.	Manure per Acre. lbs.	Area. Acres.	Total Yield. Bush.	Yield per Acre. Bush. lbs.
Correll's No. 2	June 9	40	40	1½	32	21 20
Taragon	June 9	40	40	1½	26	17 20
Baroota Wonder	June 14	40	40	1½	36	24 —
Triumph	June 14	40	40	1½	30	20 —
Bunyip	June 14	40	40	1½	33	22 —
White Tuscan	June 14	40	40	1½	27	18 —
Yandilla King	June 14	40	40	1½	32	21 20
Huguenot	June 14	40	40	1½	18	12 —
Medeah	June 14	40	40	1½	20	13 20

TABLE II.—*Manurial Test—Variety of Wheat—Federation.*

Date Sown.	Seed Sown. lbs.	Manure per Acre	Area Acres.	Total Yield. Bush.	Yield per Acre. Bush. lbs.
June 10	40	No manure	5	66	13 12
June 12	40	30lbs. super.	5	81	16 12
June 12	40	45lbs. super.	5	93	18 36
June 12	40	60lbs. super.	5	102	20 24
June 12	40	75lbs. super.	5	108	21 36
June 12	40	1½cwts. super.	5	108	21 36
June 12	40	45lbs. super., 30lbs. sulph. of potash	5	92	18 24
June 12	40	45lbs. super., 30lbs. sulph. of potash, 56lbs. of nitrate of soda	5	92	18 24

This table indicates that in the application of superphosphate to the class of country characteristic of Veitch's Well, there is a limit to the rate at which the manure may be applied. From the standpoint of immediate returns, the most profitable rate of application would appear to be 75lbs. per acre, for the net profit obtained from this application is in excess of that of any other dressing. The indirect effect of the heavier dressing of manure, however, in stimulating the herbage in subsequent seasons must not be overlooked. In considering the worth of the heavier dressing, on the other hand, it is probable that with a return to drier seasons—which we understand is sooner or later inevitable—heavy dressings may prove disastrous, for they not infrequently lead to a vigorous, sappy growth in the early stages of the plant's existence, and when the hot spells of spring arrive transpiration through leaf and stem become unduly excessive, and leads frequently to partial failure.

TABLE III.—*Cultivation Test.—Variety of Wheat—Federation.*

Date Sown June	Seed Sown. lbs.	Manure Applied. lbs.	Cultivation.	Area Acres.	Total Yield. Bush.	Yield per Acre. Bush.
7	40	40	Fallow, 4in., 1909	10	174	17.4
10	40	40	Cultivated Sept., 1909	10	147	14.7
20	40	40	Ploughed 5in., May, 1910..	10	153	15.3
20	40	40	Ploughed 4in., May, 1910..	10	186	18.6
20	40	40	Ploughed 3in., May, 1910..	10	183	18.3
20	40	40	Cultivated only	10	165	16.5
20	40	40	Drilled only	10	144	14.4

The land on which this cultivation test was carried out had not long been cleared. The mere scratching of the ground appears to give in the Loxton country a far better return than one might expect. From the table it will be seen that the block of 10 acres, without any cultivation whatever, save that involved in drilling, returned 14·4bush. per acre. Land merely cultivated and not ploughed gave 16·5bush. per acre; land ploughed 3in. deep just before seeding, 18·3bush.; while working 5in. deep produced lesser crop than that of the deeper ploughed plot. The results are eloquent testimony of the fertility of that large area of country about to be opened up by the Brown's Well railway.

TABLE IV.—*Seeding Test.—Variety of Wheat—Federation.*

Date Sown.	Seed Sown. lbs.	Manure Applied. lbs.	Area. Acres.	Total Yield Bush.	Yield per Acre. Bush. lbs.
June 23	35	40	5	72	14 24
and 24	45	40	5	81	16 12
	55	40	5	84	16 48

From Table IV. it would appear that the most profitable rate of sowing seed in such a season as we have just passed through is 45lbs. to 55lbs. per acre.

TABLE V.—*Oats Test.*

Variety.	Date Sown.	Seed Sown. Bush.	Manure Applied. lbs.	Area. Acres.	Total Yield Bush.	Yield per Acre. Bush. lbs.
Scotch Grey	June 27	1	40	2	37	18 30
Cape	June 27	1	40	2	12	6 —
Garton	June 27	1	40	2	22	11 —
Algerian	June 27	1	40	2	27	13 30

Scotch Grey heads the list with 18½bush., followed by Algerian and Garton. Cape oats, though of beautiful quality, were practically a failure.

TABLE VI.—*General Wheat Crops.*

Variety.	Date Sown	Seed Sown. lbs.	Manure Applied. lbs.	Area. Acres.	Total Yield. Bush.	Yield per Acre. Bush. lbs.
Cumberland	June 13	40	40	18	279	15 30
Cumberland	June 25	40	40	15	198	13 12
Silver Baart	June 26	40	40	12	114	9 30
Federation	June 6	40	40	10	123	12 18
King's Red	June 8	40	40	4	60	15 —

LOXTON FARM.

On the Loxton Experimental Farm manurial and variety tests were carried out on lines similar to those at Veitch's Well. The returns from the manurial plots are slightly higher than those of Veitch's Well, but this may be accounted for by the fact that the plots at Veitch's Well were all sown with Federation wheat, while at Loxton an earlier wheat (Cumberland) was used. Cumberland seems to do particularly well at Loxton, though its tendency to shell

is a serious drawback. In the case of the manurial plots there was a steady increase in the yield as the quantity of manure increased, and the maximum return was reached with a comparatively heavy dressing of superphosphate, namely, $1\frac{1}{2}$ cwt. per acre. In looking over the results we must not lose sight of the fact that the season was particularly favorable, and it must be borne in mind that under less favorable circumstances lighter applications might be more profitable. Again, it is satisfactory to note the comparatively high natural fertility of these soils, for the unmanured plot yielded a return of 18 bush. an acre. The following table summarises the results:—

Manurial Tests.

Cumberland seed was sown at the rate of 50 lbs. to the acre.

Date Sown.	Manure per Acre.	Area. Acres	Yield per Acre.	
May			Bush.	lbs.
12 to 17	No manure	$1\frac{1}{2}$	18	—
17	30 lbs. super.	$1\frac{1}{2}$	20	—
17	45 lbs. super.	$1\frac{1}{2}$	22	—
17	60 lbs. super.	$1\frac{1}{2}$	23	20
17	75 lbs. super.	$1\frac{1}{2}$	26	—
17	$1\frac{1}{2}$ cwt. super.	$1\frac{1}{2}$	30	—
17	45 lbs. super., 30 lbs. sulph. potash.	$1\frac{1}{2}$	22	20
17	45 lbs. super., 30 lbs. sulph. potash, 56 lbs. nitrate of soda	$1\frac{1}{2}$	27	—

Variety Tests.

In the variety wheat tests the early wheats and the Durums did best, though the season was rather in favor of late wheats. In each instance 50 lbs. of seed and a similar quantity of manure per acre were drilled in. Old super. was employed in the case of the Silver Baart.

Variety.	Area. Acres.	Total Yield Bush.	Yield Per Acre.	
			Bush.	lbs.
Gluyas	$1\frac{1}{2}$	42	28	—
Bunyip	$1\frac{1}{2}$	36	24	—
Ahweedjah (Durum)	$\frac{1}{2}$	12	24	—
Mahmoudi (Durum)	$\frac{1}{2}$	12	24	—
King's Early	$1\frac{1}{2}$	34 $\frac{1}{2}$	23	—
Tarragon	5	105	21	—
Huguenot	$1\frac{1}{2}$	28 $\frac{1}{2}$	19	—
Correll's No. 2	5	84	16	48
Comeback	8	129	16	7 $\frac{1}{2}$
Hmeerah (Durum)	$\frac{1}{2}$	8	16	—
Baroota Wonder	$1\frac{1}{2}$	19 $\frac{1}{2}$	13	—
White Tuscan	$1\frac{1}{2}$	16 $\frac{1}{2}$	11	—
Federation	35	264	7	33
Silver Baart	12	276	23	—

The Manager of the Loxton and Veitch's Well Experimental Farms (Mr. H. C. Wilson) has carried out his duties in a very thorough and systematic manner, and is deserving of the highest credit for his skilful management of the farms.

SHANNON EXPERIMENTAL FARM.

Last year a forfeited block of land in the hundred of Shannon was handed over to the Agricultural Department for experimental purposes. Work was begun in April, and naturally the operations were chiefly of a preliminary character. During the year nearly 500 acres of scrub were cleared, and probably 300 to 400 acres will be sown this coming season. Owing to the late start, only 80 acres could be sown, and most of this was cut for hay—50 acres reserved for hay yielded at the rate of $1\frac{1}{4}$ tons per acre. Many improvements were carried out. Besides clearing nearly 500 acres, a six-roomed residence was erected, and a 12-stall stable, implement shed, barn, and workshops, and a fair amount of fencing was done. The block contains 1,164 acres, and possesses types of soil characteristic of a vast area on Eyre's Peninsula. The experimental work conducted in the future, therefore, should prove of the greatest value to the large area of country about to be opened up by the extension of the Port Lincoln railway. The work to be done at this centre is of a similar character to that carried out at other experimental farms, and will comprise variety tests with different crops, comparison of different methods of cultivation, quantitative seed and manure tests, and the raising of seed for farmers of the district.



THE SINGLE TESTING SYSTEM OF BREEDING FOR EGG PRODUCTION.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

Poultry-breeders have long known that high egg production is a matter of strain, and that individual hens are heavy layers and others poor layers. It has long been the rule among experienced breeders to carefully select their breeding stock and mate them on modern principles; thus the well-known South Australian laying strains have been perfected. The high laying power of the original individuals have become fixed as a hereditary characteristic. Breeders at an early date noticed that a strain of heavy-laying fowls could be built up only by breeding from selected layers of marked fecundity. Guesswork gave uncertain and negative results, and it was long ago recognised that some method of measuring a hen's actual laying capacity was absolutely necessary. Trap-nests, as they are called, were invented and are still in common use. Briefly, they were so constructed that when a hen entered them to lay, in the inviting looking nest provided, she mechanically locked herself in and could not escape until her egg was collected and marked and her identification number recorded. The more modern practice in South Australia is to ascertain a pullet's egg production before she is bred from. It is a bad practice to breed from pullets or hens undergoing a test which may prove them to be worthless as breeders. Besides, it is abundantly proven that stock bred from pullets are not equal, in constitution and many other points, to stock bred from second season hens. I speak here of utility breeding for egg production, and am not concerned with the practice of exhibition poultry breeders. The construction of the pens is described later. My reasons for discarding trap-nests are as follows:—

1. Although there are many good trap-nests, I have known of many serious injuries to hens and pullets.

2. Some hens will not enter trap-nests; others become very excited and the egg production is seriously affected.

3. The trap-nests require constant supervision. It is quite wrong to leave a hen confined for any length of time in the small space provided. From a commercial point of view the cost of such attention is too great.

4. It is impossible to eliminate every source of error where trap-nests are used, and the records, though faithfully kept, are not reliable.

5. The poultry-owner who finds it necessary to apply a test to all his hens or pullets does not rank in my estimation as a breeder. It may happen that a breeder may yard his selected stock together and then trap-nest them.

6. The cost of trap-nests, either in cash or in time and labor, is more than is generally estimated, and there are constant repairs and renewals, of which we hear little.

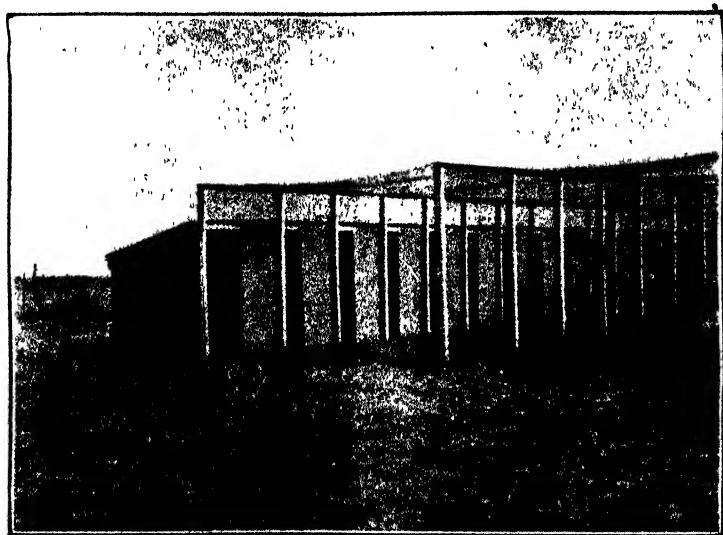
My reasons for advocating the single pen system are—

1. There is no mechanical device to frighten or injure the fowl.
2. She is well-housed and has sufficient room for exercise.
3. All possible errors in identification are eliminated.
4. The general character of each fowl can be studied daily and without any trouble. This is, of course, a most important consideration.
5. You are in a position to control her food supply, and, by comparison with others undergoing the test, you accumulate valuable data.
6. By carefully studying the occupants of the various pens you will with greater certainty observe divergence from type, tendency to a general type, and other characteristics. This accumulated knowledge, especially if tabulated and recorded with pedigree charts and photographs of the individuals tested, becomes an invaluable record.

SELECTION.

The importance of systematic selection is gaining general recognition as the basis of the breeder's art. It is not, in my opinion, properly carried out unless on broad lines. The general tendency is for like to produce like, but only when selection has resulted in stock pure for the desired characteristics. The old and accepted theory was that in all cases "like beget like," but the great advance in knowledge of breeding, due to the application of Mendel's law of segregation, has made clear the exact conditions under which alone we can expect like to beget like. One of the most important discoveries of modern times is that of the purity or otherwise of the gametes (male and female germ cells); until this was recognised breeders were groping in the dark, and most of their results were more or less accidental. The value of selection, when proceeded with in the light of modern knowledge, is immensely greater than it was. We know that our first step in developing any one characteristic is to acquire by selection birds or animals in which that characteristic is pure. When once this is gained a course of rigid selection must give the maximum development of that particular characteristic. The limits of this article do not permit of detailed explanation of the various laws, nor even a brief account of the countless classical experiments which have been made in recent years. Where egg production is the end in view our endeavors should tend to concentrate the energies of the pullet or hen on that function. This view of the case will at once indicate the unreasonableness of attempting to develop in one fowl the opposing characteristics of high egg production and maximum flesh development. Although a course of rigid selectional breeding will result in the production of strains of great layers, it must not be thought that a lasting structure can be erected and

maintained upon any but a scientifically sound foundation. Mere selection for one characteristic is generally at the expense of all other characteristics, and the result of such a course would be a fatal lack of balance. Selection has its limits, but that limit is very far above the general average. It is not true that selection results in mediocrity: the method that so results is not worthy of the name of selection. Continued high egg production must be recognised as possible under two main conditions—(1) Through inheritance due to scientific selection with the view of fixing and developing that characteristic. (2) Through physical fitness of the hen or pullet. The processes of metabolism must be normal and capable of legitimate development. The inherited capacity for transforming the energy of surplus food into eggs instead of flesh and waste must be coupled with the physical capacity to do



General View of Single Pens.

so. Egg development and the subsequent extrusion are both physical labor in a high degree, further emphasized by the actual shock of almost daily repetition. Therefore it is evident vigor and a robust constitution are important characteristics, the inheritance of which must be assured by fixation due to selection.

OTHER POINTS.

Although at first sight the modern conceptions of the laws governing inheritance seem complex, there are a few of such practical importance to the breeder that he may concentrate on these, almost disregarding all other points. Without fully discussing the latter generalisation, it may be remarked that the careful breeder will always notice when the accumulations of small

deviations in any one minor point amount to a serious difference and will take action in time. To the poultry-breeder may be mentioned some of the so-called minor points when compared with the main one of egg production. I will name some of these, because there is a generally prevalent opinion that nothing is of consequence other than capacity for egg production—a fatal error, due to misconception.

Type.—Generally speaking this is debatable ground, largely caused through misconception or perhaps ignorance. Type has been subject to modifications at various times. To state a case one would not be wise in attempting selection for egg production using as material the English exhibition White Leghorn, which is practically a breed distinct from the original Leghorn as introduced to England 40 years ago. As a general rule deviations from standard type end in other serious modifications.

So-called Fancy Points.—Many of these are characteristic of a breed in its purity, and are to a large extent distinguishing factors. Disregard of these may end in a gradual, sometimes sudden, alteration of a serious nature. The combination of certain external characteristics is pleasing to the eye; modifications often give displeasing results—a mongrel appearance. A strain of fowls may be pure for any one or several characters. Where a breed is pure for any character its inheritance can be calculated, but it is also certain that by selection any character can be either eliminated or fixed, as desired.

Broodiness.—For egg production it is of course highly desirable that the maternal characteristic known as “broodiness” be eliminated. This character is inherited in a definite ratio. In the present state of our knowledge the exact process of the reappearance of this lost characteristic in the non-sitting breeds is not known. It has been surmised that broodiness is due to a ferment or enzyme. That is probably the case, but the reappearance is due to imperfect demarcation of its “presence” or “absence.” There may be another character, intensified perhaps by nervous excitement, which holds in check this character which, while really “present” in a very dilute form, is still capable of reappearance, and would thus account for a supposed mutation, or be accounted a case of atavism. The importance of rigidly discarding from the breeding pen any specimen showing the least signs of “broodiness” cannot be too strongly emphasized.

Structural.—Structural deficiencies, including weakness in the organs of reproduction, are definitely known to conform to the general law of inheritance, and the inclusion of stock of this class can but end in disappointment. It may appear to the experimenter that the conditions are unduly rigid; so also are the laws of breeding. The work of the modern selector is in eliminating the results of the carelessness and mishaps of the past, and at the same time building up the general capacity of fitness for the prime result of high egg production. The true meaning of the modern conception of the

purity of a character and its mode of inheritance is the fitness of the bird or animal to maintain that character in its highest form. Thus it is quite conceivable that a strain of hens may be so developed by selection as to possess the potentiality of very high egg production, and yet through non-elimination of a weakness in the organs of generation (inherited) the birds have but a short life of productiveness.

PEDIGREE.

An accurate knowledge of the pedigree of the subject of selection is most helpful; unless strictly accurate, the value is nil. From any starting point the process of selection must include an accurate history of each subject. Written records are alone of use because, however good the memory of the breeder, errors small or great are likely to occur, and time may be lost. In selecting and mating the breeding pens for the production of future generations, and for correcting errors, an accurate knowledge of each inmate of the pens is of vital importance. The due maintenance, through successive generations, of any characteristic depends on mating sexes both of which are pure for that characteristic. If one is pure and the other impure, the progeny will consist of a few pure and probably three times the number impure; that is to say in other words, if a tested layer be mated with a male bird whose dam was a poor layer and descended probably from a line of poor layers, the pullet progeny will certainly all be poor layers, some of which, if bred "in the family," might produce good layers in the second generation. To such an extent does this rule apply that experience teaches that the mating must be "in the line," and that the introduction of fresh blood, even of equal value as regards laying, will often give results similar to those where the pedigree was poor for laying.

FOUNDING A STRAIN.

First Year.—With due regard to the general principles enunciated, the breeding pen or pens should now be mated, and as large a number of chickens reared as can be properly accommodated without overcrowding. The difficulty in obtaining stock with a satisfactory and reliable pedigree renders it necessary to both "line breed" and "inbreed" so as to have as many matings as possible. In working according to Mendel's law the proper course is to breed the various generations *inter se* until segregation is definitely assured. This the breeder characterises as "inbreeding" and "undesirable." There is no more harm likely to result from this method if properly conducted than from any other method; less so, in fact. It is commonly asserted that change of blood is necessary to maintain vigor, &c. The truth is that it is necessary to gloss over, in a happy-go-lucky way, the errors of the past due to a lack of proper conception of the importance of thorough selection. Never breed from the unsound or unfit and your work will progress, but if

one parent be unsound no amount of fresh blood will give any definite improvement. Such a course may enable you to continue a faulty system not worthy of the name of "breeding."

Second Year.—Select from the progeny resulting from the first mating as follows, with due regard to type, constitution, activity, and main outward points generally characteristic of layers. Toepunch all chickens when hatched. (See list of toepunch marks, page 759.) Place numbered legbands on each adult retained. Enter number and detail in a book kept specially as a record of the breeding from year to year. Put each pullet in a single testing pen, and take her record for 12 months. Put the cockerels in spare yards or pens, as far removed from the hens and pullets as possible. These cockerels will be wanted for breeding from in the second year. They may run with other hens not used in this scheme.

Third Year.—Select for the breeding pens all the pullets which gave a satisfactory yield in the single pens. 1. Mate some of these back to the old male bird. 2. Mate the rest with selected males of the same year and breeding. 3. Mate one selected cockerel to one-half of the original hens. 4. Mate one selected cockerel to the other half of the original hens. You will now have four groups, three of which are continuing the strain by line breeding, and the other group, No. 2 (one or more pens), will continue the strain according to Mendel's law.

The Fourth Year.—Continue the line-breeding groups as far as desired, but the Mendel groups (inbred) should have given you at least one line of fowls pure for high egg production. If all your methods have been accurate, this strain will prove of the highest value. It is hardly necessary to point out that it is infinitely preferable to single pen each hen in the breeding season and to let the male bird selected be with each hen for a given period. Fertility may be depended upon, and, in addition, you may discover cases of sexual antipathy from which no good results can be expected, and re-mating must be resorted to. The utmost precision and accumulation of detail will give you certain results at an early date. Your work once done will be valuable and lasting. If otherwise, you will always be at work with indefinite and even negative results.

THE SINGLE PEN.

Some people who have had no practical experience of the system of single pen testing have expressed the opinion that the health of the birds must suffer, and that their subsequent value as breeders must be lessened, if not destroyed. Accumulated experience teaches the opposite, but of course much depends on the construction of the house and yard, forming the pen, and also the method of feeding adopted. In South Australia the mild climate admits of very simple but none the less effective structures. The severe climates of some other countries necessitates modifications in construction. In all mild to warm climates the materials used and the method of construc-

tion should offer as little harbor for vermin as possible. For Australia and similar climatic conditions the framework of the houses should be of hard-wood free from all cracks, and should be moderately smooth. The covering material may be of corrugated galvanized tinned iron (narrow fluted), or compressed asbestos (fibro cement) sheets. Weather-boarding, and similar material, offer harbor for vermin, and are liable to crack, twist, and warp. The single pens may be fixed or movable. The dimensions of the pens need be not more than 3ft. by 20ft., and the roosting and laying house 3ft. square. To have the yards less than 3ft. in width is inconvenient for the average person; any additional width adds to the expense of construction.

SINGLE TESTING PENS.—PLATE I.

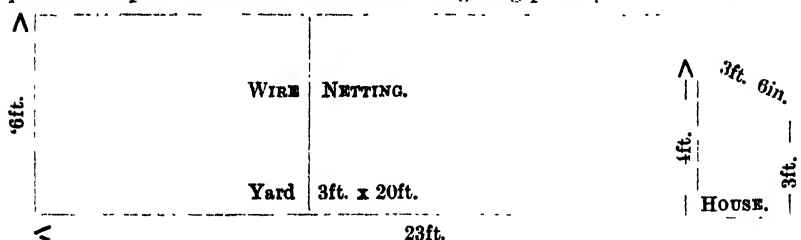
3ft.									
3ft.	House	House.	House.	House.	House	House.	House.	House.	House.
Yard 3ft. x 20ft.									
	Gate.	Gate.	Gate.	Gate.	Gate.	Gate.	Gate.	Gate.	Gate.

GROUND PLAN.—TEN TESTING YARDS AND HOUSES.

Portable pens allow the ground to be changed daily, and where grass, clover, etc., are abundant, this method is much appreciated by the birds. Fixed pens are more convenient where large numbers of birds are being simultaneously tested. In all cases the pen, portable or fixed, should be numbered, and the hen therein should also have a legband with a corresponding number.

The continuous shed is most suited to this climate, and a permanent structure should be of the following dimensions for testing 20 pullets:—Length, 60ft.; height in front, 4ft.; height at back, 3ft. Set out two lines of posts

each 3in. x 2in. and 3ft. apart inside, posts in each line to be spaced 3ft. apart from centre to centre: set them about 18in. in the ground and in perfect line and level at top. Now securely spike a soft wood rail 2in. x 2in. and housed flush into the posts and level with the top of back row of posts. A rail of same dimensions is similarly affixed to and 2ft. from the tops of the front row of posts, which should be 6ft. above the ground. The iron forming the back of the house is buried 6in. deep in the ground and then securely fastened to the top rail. As 3ft. 6in. sheets of iron are not made, a 7ft. sheet cut in half serves the purpose. The roof is made of 7ft. sheets cut in half and will then allow for a few inches to overhang front and back. The house divisions between the pens are best made of plain (flat) galvanized iron nailed to the posts and cut at top to the slope of the roof; the bottom should be buried in the ground about 3in. or 4in. A single sheet of corrugated iron, of which 2in. are turned back, fastened in front of the house will provide ample shelter and act as a screen giving privacy to the hen and allow



SIDE ELEVATION OF YARD AND HOUSE.

14in. space for the hen to enter. This front screen may be held in position in several ways so as to be readily removed, or it may be permanently fixed. The opening left is 1ft. 2in. wide and as the house is so small is sufficient to enable the eggs to be reached and the house to be kept clean. A shallow nest is hollowed out in the ground and lined with short straw or dry grass; a perch 1ft. long and resting on a peg driven into the ground is all that is required. For a 20-ft. run two additional posts are required, and should stand 6ft. out of the ground and level with those forming the front of the house; the end post should be strutted. The wire netting covering may be of 2in. mesh or smaller and 6ft. 6in. wide. It must be let into the ground 6in. and should be fastened to a galvanized wire, No. 8 gauge, tightly stretched from post to post at the bottom of the trench. This will prevent the hens from scratching holes and passing from one pen to another. Gates 3ft. wide may be made of soft wood 2in. x 1in. bolted together with $\frac{1}{2}$ in. bolts and hung on stout tee hinges; the gate is covered with netting securely fixed. The pens should be roofed with wire netting stretched tightly and laced with binding wire to the netting forming the divisions. The door or gate should be provided with a reliable fastening, or may be padlocked for

greater security. The runs may be floored with grass, hay, or short straw to a depth of 6in. to afford exercise to the hen in scratching for grain, seeds, etc.; this is an important consideration with fixed pens. Portable pens must be strongly constructed and be placed on level ground; otherwise there is some danger that the hen will scratch her way out. Keep the hens busily



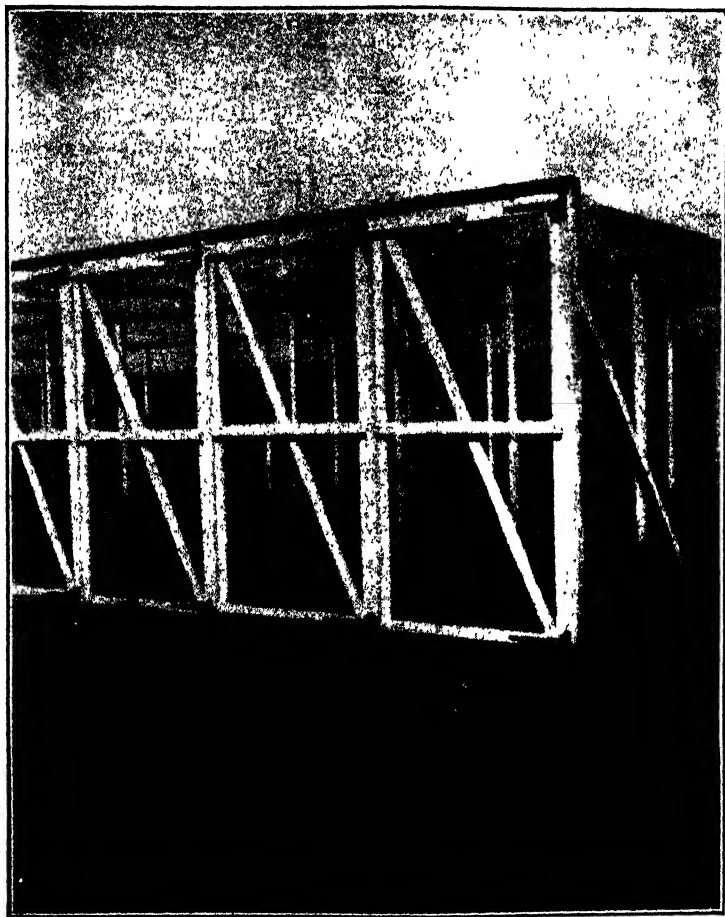
Front View of House.

employed scratching all day. In wet climates it may be necessary to cover the runs to keep them dry, but the hens will not remain so healthy. In cold climates the construction must be modified to suit low temperatures, and the house must be deeper so that a drop curtain may be used if necessary. There should be near the gate a small movable shelter, under which the food trough and water vessel, grit, and charcoal hopper may stand. In very severe

climates (hot or cold) the back and roof may be protected with a layer of several inches of straw thatching, kept in position by wire netting of large mesh. This is very effective, and can be speedily renewed as required.

FEEDING.

For Australia and similar climates I recommend the following foods:—Wheat bran (or sharps), wheat pollard (also known as middlings), cut green-



View Showing Gates.

food, lucerne (alfalfa) hay chaff, clover hay chaff, animal food (fresh meat or meat meal), sharp grit, shell grit, small charcoal, and fresh clean water. Grain in variety according to climate; in Australia, wheat principally. The morning meal is prepared as follows:—One part bran to two parts pollard, varied slightly according to the amount of flour left in the pollard; to this

add one-third by bulk of chaffed greenfood, lucerne, clover, or lucerne hay chaff which has been steamed for some hours in hot water. The animal food may be given in the form of soup made either of fresh meat or of meat meal and used to moisten the mash. Three or four times a week animal food may be given, but excess is a grave mistake. Fowls may eat insect life almost without limit, but animal food in the form of flesh or meat meals has a different effect. To give the quantities of meat scrap advised for some countries would end in speedy disaster in this country. Where oats are milled, finely ground oats will give good results as soft food or mash; and in very cold climates a little barley meal or corn (maize) meal may be added, but with caution. At midday a handful of chaffed greenfood (cabbage, kail, silver beet, clover, or lucerne) may be given. An hour before dark throw a handful of grain (good wheat for preference) in the straw litter; this will occupy the pullet for some time. Always keep grit (both quartz and shell), small charcoal, and fresh clean water in the pens. The water vessel should be cleaned out daily and refilled as often as required, and should be scalded and disinfected once a week. The method of feeding advised is one that will provide all the constituents necessary to fulfil the life functions and give a surplus for egg production. On no account should an attempt be made to force the egg production. You wish to ascertain what the hen will do under suitable conditions and on normal feeding, and you also hope to have a sound healthy hen at the termination of your test. Forced pullets are afterwards valueless as breeders. Avoid patent foods, spices, and other nostrums; they should have no place in the practical man's food-house. Endless harm has been caused to the poultry industry in all countries by the foolish practice of using nostrums, so-called tonics, &c. A carefully bred fowl, if properly housed in a well-ventilated clean house, needs nothing more than a sufficiency of sound, wholesome food and fresh clean water. Give what variety of food you can afford or obtain, but remember egg production depends on the use of food having the necessary constituents, and that what may suit pigs for fattening may not suit laying hens. All mash or soft food should be most thoroughly mixed by hand until of a crumbly consistency. Lazy people recommend shovels, &c., just as the workmen mix concrete; that is, the lazy man's method and is very ineffective. Success in poultry feeding and breeding requires thoroughness in every operation and the avoidance of the lazy man's so-called "time-savers."

SPECIMEN PAGE STUD BOOK.

Pen No. 1.

Male. No. 207.

Females. No. 307, 308, 309, 311, 315, 320, 311, 359, 384, 400.

WHITE LEGHORNS.

Remarks.

Mated up.....

Eggs laid.

Chickens from this pen toepunched ♂ ♂ (outer right web).

General.

Eggs tested for fertility.

SINGLE TESTING PENS.

EGG RECORD BOOK.

[Specimen Page.]

January, 1911.

Pullet No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total.
25 ..	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	29
26 ..	*	*	*	*					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	16
27 ..	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	30
28 ..	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	29

SPECIMEN PAGE, STUD REGISTER

♂ = Male.					♀ = Female.	
Legband No.	Sex.	Breed.	Hatched.	Pedigree.	General Characteristics.—Remarks.	
20	♂	W. Leghorn	1910	10 ♂ × 12 ♀	Good type, white color, fair comb, active, healthy, constant crower, very vigorous.	
21	♀	W. Leghorn	1909	Pen 21—1909	Good laying type, medium size, fine head, active, good feeder, tested to 1 year, 231 eggs. Egg, 26oz. to dozen! fine strong shell, good shape.	

LIST OF TOEPUNCH MARKS.

Foot.			Foot.		
Right.	Left.	Pen No.	Right.	Left.	Pen No.
⤴	⤴	1	⤴	⤴	9
⤴	⤴	2	⤴	⤴	10
⤴	⤴	3	⤴	⤴	11
⤴	⤴	4	⤴	⤴	12
⤴	⤴	5	⤴	⤴	13
⤴	⤴	6	⤴	⤴	14
⤴	⤴	7	⤴	⤴	15
⤴	⤴	8	⤴	⤴	16

Small punches specially made may be purchased at a small cost, a small leather punch will serve the purpose. The hole is punched in the web connecting the toes. The chickens should be examined after a week, as sometimes the holes close again. The process is painless.

AGRICULTURE IN OTHER LANDS.

By Professor PERKINS, Principal of Roseworthy Agricultural College.

FRANCE.

I was in France from September 6th to October 14th, visiting successively as centres Paris, Avignon, Marseilles, Montpellier, Cette, Carcassonne, Bordeaux, and Bayonne. Whilst these various towns were my headquarters, I availed myself of the opportunity to make excursions in their immediate neighborhoods. I should have liked to have been in a position to visit other centres, but, unfortunately, neither the time nor the means at my disposal permitted of this.

THE FRENCH MERINOS.

Whilst at Paris I endeavored to visit the Institut Agronomique and the Grignon Agricultural College. Unfortunately, at the time, both of these institutions were in recess, and on arrival I was greeted by the concierge—sole officer left in charge. I was more fortunate at the Bergerie Nationale of Rambouillet. Here, at least, I was very courteously received by the manager, and shown over the stud Merinos. The relatively great age of this State institution may be gauged by the fact that I was able to see there the 122nd, 123rd, and 124th generations of sheep bred directly from Merinos imported originally from Spain. The Rambouillet Stud Farm originated in 1786 with the presentation by the King of Spain to Louis XVI. of France of 334 ewes, 42 rams, and 7 bell-wethers. Those selecting the sheep are said to have received instructions from the King to get together some of the finest types of the breed to be found in Spain. A second importation took place in 1800, but since that time the Rambouillet Merinos have been bred continuously without the introduction of new blood. The flock has all the appearance of vigor and health, and does not in any way appear to have suffered by this prolonged period of inbreeding. I must say that I was very favorably impressed with the general bodily development of these sheep. As mutton sheep they appeared to me to be superior to the South Australian bred sheep. They are more compact and blocky, with broader and deeper chests; the legs are set wide apart, the ribs well sprung, the backs level, and the legs

relatively short and stout. They carry a leg of mutton superior to that carried by our own Merinos. They are not, of course, plain-bodied sheep, but carry very pronounced neck-folds, and occasional body-wrinkles, but not in the exaggerated style of the Vermonts. The wool is on the fine side, but showing practically no yolk at the time that I examined it. I was not able to form any idea of the length of the staple, as the sheep were not in full fleece at the time. The manager, however, informed me that the rams averaged from 20lbs. to 22lbs. of wool. I was anxious to know what might be the average carcass weight of a wether: the manager, however, informed me that he was without experience in the matter, as they very rarely killed any on the premises. He was of opinion, however, that the carcass weight would vary between 100lbs. and 120lbs. I am inclined to think, however, that he was in error, as it did not appear to me likely that they would kill at more than 80lbs. to 90lbs.

The Rambouillet flock, which has continued State property ever since its initiation, is kept exclusively for the purpose of rearing Merino rams, which are sold by auction to private owners. At the time of my visit the flock consisted of about 750 sheep, 500 of which were ewes.

When comparing these sheep with our own there is one point that must not be lost sight of, and that is that for over 120 generations these sheep have been very largely house-fed, and, from our point of view, more or less pampered. It is more than probable that under average South Australia conditions they would be found to lack stamina and constitution. I found the rams to be housed in roomy closed buildings, with an abundance of litter; whilst in fine weather they are given access to neighboring yards, in which they are permitted to sun themselves. Whilst I was examining the rams I overheard the manager and shepherd discussing the advisability of opening or closing certain windows which might expose the sheep to dangerous draughts. The fact of the matter is that the climate of Paris can hardly be described as an ideal one from the Merino point of view, and it is a matter of surprise to me that they should have continued in good health for over a century.

I was pleased to have the opportunity to look over this flock, if only for the fact that it afforded a clear demonstration that the Merino admits of being converted into a far better mutton sheep than is usually thought in Australia, and this without unduly sacrificing the wool. I have always held that so soon as we shall have produced strains with better bodily development than at present obtains we shall have in the Merino the ideal farmer's sheep, just as at present it is the ideal grazier's sheep.

As I had occasion to observe later on, there is no doubt that the Rambouillet Merino is now a vast improvement on the original Spanish Merino. The following figures, taken from the work of a former manager of the Bergerie,

will serve to show the extent to which the flock has varied over the course of a century :—

Average Weight of Ram Fleeces.

Year.	Number of Fleeces Weighed.	Average Weight of Fleece. Lbs.
1794	99 ..	7.48
1800	26 ..	9.35
1804	45 ..	9.46
1834	107 ..	12.23
1838	49 ..	11.22
1847	12 ..	12.14
1851	4 ..	12.20
1869	67 ..	14.64
1877	79 ..	16.74
1887	138 ..	17.27

Average Live Weight of Rams.

Year.	Number of Rams Weighed.	Average Weight of Rams. Lbs.
1802	4 ..	144.1
1847	12 ..	209.1
1851	4 ..	176.3
1869	7 ..	188.26
1877	15 ..	182.3
1887	56 ..	163.9

Data as to Quality of Fleeces.

Period.	Length of Staple. In.	Serrations to the Inch.	Diameter of Fibre. In.
1787-1796.....	2.20	.. 38.9	.. 0.00085
1797-1806.....	2.34	.. 43.5	.. 0.00084
1807-1816.....	2.30	.. 41.5	.. 0.00080
1817-1826.....	2.22	.. 42.4	.. 0.00078
1827-1836.....	2.13	.. 41.4	.. 0.00080
1837-1846.....	2.18	.. 44.2	.. 0.00080
1847-1856.....	2.36	.. 42.0	.. 0.00082
1857-1866.....	2.29	.. 41.6	.. 0.00087
1867-1877.....	2.61	.. 40.0	.. 0.00089

Thus these tables show that during the course of a century the live weight and fleece of the Spanish Merinos have been considerably increased at Ram-bouillet, and that at the same time the length of staple has been added to without appreciable loss of character and fineness in the wool.

IN SOUTHERN FRANCE.

On September 22nd I left Paris for the south of France, stopping first for a few days at Avignon, at one time the capital city of the exiled popes, now the centre of an important vine-growing district. To a lesser degree the neighborhood is addicted to the growing of what the French know as "primeurs" for the larger centres; that is to say, early vegetables, fruit, flowers, &c. In this direction, however, improved methods of oversea carriage have served to render Algeria, with its warmer climate and cheaper labor, a severe competitor. The growth of vines in this district is by no means equal to that of well-grown South Australian plants. Vintage was over at the time of my visit, and had proved practically a failure: too much rain and a virulent outbreak of fungus diseases were the causes usually given in explanation.

The extent to which the Occidental plane tree has been adopted in these districts as an avenue tree is very remarkable. Mile after mile of white dusty road is pleasantly shaded by rows of these handsome, well-grown trees; only very occasionally are the latter replaced by the erect-growing cypress. White, dusty roads, shaded by wire fences, are not unknown in South Australia, and the thought occurred to me that many of our district councils might do something towards improving the lot of the wayfarer in this direction.

It is a common sight in the Provencal vineyards to find one of the principal rules of the art completely set at nought; vine and olive trees, occasionally in rows, occasionally in irregular distribution, are to be seen struggling together on the same plot of ground. It appears needless to add that such an association ends much to the detriment of the vine. In past times, however, the olive has frequently proved the more reliable wage-earner.

I noticed whilst in this district that the railway companies do not disdain to load loose straw on their goods trucks—a practice that would hardly be admitted in Australia for hay. On the other hand, wherever I happened to come across baled straw, I noticed that the bales had been secured with five wires, and not with two or three, as is the invariable practice with us. This unnecessarily generous use of wire must serve considerably to raise expenses connected with the baling process.

I now found myself in the south of France, where, as a matter of course and of principles, what is known as *vin ordinaire* is always included in the price of a meal. It should be stated straight away that the south of France, which produces some excellent wines, owes no debt of gratitude to the hotel-keepers who advertise their wines in so gratuitous a manner. With one exception I found these *vins ordinaires* abominable: very frequently pricked, always immature, often watered, and never drinkable. It is but natural that the traveller should form his idea of the wine of the country from the samples supplied him by otherwise excellent hotels; and yet there is no doubt but that the average south of France wine is a long way ahead of anything

supplied in the way of *vin ordinaire* by a good hotel. I can recollect but one instance in which I could derive any satisfaction from the hotelkeeper's gratuitous offering.

In the neighborhood of Avignon there has long existed a celebrated vineyard, known as Chateau-neuf-du-Pape: very extensive at one time, and, as its name indicates, belonging to the papal domains; it has now been split up into a number of small holdings. The wine made in these vineyards has long been reputed one of the best in the south of France. I had the opportunity of sampling some of it; to my taste, however, it appeared to be no more than the shadow of its former greatness. The old vineyards were completely destroyed by the phylloxera, but have since been wholly replanted on resistant American stock.

THE VINES OF LANGUEDOC.

From Avignon, on September 26th, I passed to Montpellier *via* Marseilles and Tarascon. The Rhone, which for some hundreds of miles flows almost exactly from north to south, in approaching the Mediterranean divides off the two ancient provinces of Languedoc and Provence, which, in the aggregate, are to-day commonly referred to as the "midi" or "southern districts of France." Agriculturally, Provence is characterised by the olive, the vine, and various primeurs; whilst its neighbor, Languedoc, is given up almost entirely to the vine. Avignon is situated on the border of the two districts, and if, as I had occasion to do, one proceeds from this town in a westerly direction it is as if one were passing through one huge continuous vineyard, and the illusion is heightened by the fact that very rarely do fences or divisions of any kind separate one owner's block from that of his neighbor. From the point of view of total area under vines and total quantities of wine produced this district must undoubtedly be reckoned the most important vine-growing district in the world; and to such an extent is the population dependent on the vine for their livelihood that any crisis affecting it speedily reduces them to the greatest distress. It is not so many years ago that a meeting of over 500,000 vinegrowers assembled at Montpellier to protest against the apathy of the Government to the general distress of the people. The hot southern blood even led to some talk of secession, although in reality the latter was never seriously entertained. In the end, however, the objects of this great popular uprising were secured: Government was compelled to realise that it was dealing with a national industry, the ruin of which it could not afford to overlook.

Some idea of the importance of the vine in Languedoc may be gathered from the consideration of a few statistical data, which I owe mainly to an interesting pamphlet published in connection with the 1910 Brussels Exhibition. Roughly speaking, the old province of Languedoc was split up after the Revolution into what are to-day the Departments of Gard, Hérault,

Aude, and Pyrénées Orientales, taking them from east to west. The area under vines in 1909 of these several Departments are shown below :—

	Total Area. Acres.	Area under Vines. Acres.	Percentage of Area under Vines to Total Area.
Gard	1,499,312	.. 172,877	.. 11·5
Hérault	1,549,497	.. 140,755	.. 28·4
Aude	1,578,310	.. 294,727	.. 18·7
Pyrénées Orientales ...	1,030,527	.. 151,465	.. 14·7
Four Languedoc Depts.	5,657,646	.. 1,059,824	.. 18·7
France	—	.. 4,064,072	.. 3·1
South Australia	—	.. 22,031	.. 0·009
Commonwealth	—	.. 59,450	.. 0·003

Thus we see that nearly one-fifth of the total area of the four Languedoc Departments were planted with vines in 1909, and that in the aggregate they form more than a quarter of the whole of the French vineyards. How small is our own interest in this direction is clearly shown in the comparative figures given below those having special reference to France.

When, on the other hand, we turn from areas to quantities of wine produced, the preponderating position of these four Departments as wine-producers is still more remarkable.

It has been calculated that over the past 10 years the yearly output of wine from the various vineyards of the world has averaged 3,362,700,000galls. Towards this enormous total France contributed 1,223,200,000galls., or about 36 per cent. Over the same period the average total output from the four Languedoc Departments has been represented by 484,660,000galls., or close on 40 per cent. of the total French contribution and 14 per cent. to 15 per cent. of the world's total output. Concurrently it should be noted that, from the point of view of area, the four Languedoc Departments do not occupy more than 26 per cent. of the total area under vines in France; hence they form an example not only probably of the largest aggregate area under vines in the world, but they rank amongst the heaviest yields in the world. Thus in 1909—

The 172,877 acres of Gard	yielded 528galls. per acre
“ 440,755 “ Hérault	“ 669galls. “
“ 294,727 “ Aude	“ 449galls. “
“ 151,465 “ Pyrénées Orientales	“ 484galls. “

It should not be forgotten that these figures represent averages over enormous areas, and that in individual cases these averages will be very considerably exceeded. The total average yield of the four Departments over the past 10 years is given as 490galls. to the acre. The explanation of these very heavy average yields is to be found, first, in climate and soil admirably suited to heavy production of fruit; secondly, to the exclusive cultivation of very heavy-bearing varieties; and, thirdly, to exceedingly well-conducted tillage and general cultivation operations.

(To be continued.)

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, February 8th, there being present Messrs. J. W. Sandford (chair), W. Gillard, C. J. Tuckwell, C. J. Valentine, R. J. Needham, A. J. Perkins, C. Willcox, J. Miller, G. R. Laffer, and Col. Rowell, C.B.

The Chairman on behalf of the Board extended a hearty welcome to Professor Perkins on his return from Europe. Professor Perkins in replying stated that he hoped and believed that one result of his holiday would be that his services would be of greater value to the State.

Resolutions from Congress on the subject of the veterinary examination of stallions were again discussed. Mr. Needham thought the recommendation that unsound stallions should not be allowed to come into the State unnecessary. South Australia was no longer the dumping ground for unsound stallions. Dealers now found that the majority of the buyers of draught stock asked for the official certificate, and he believed that in a few years' time it would be very difficult for anyone to dispose of a draught entire without such a certificate. The proposal would, in his opinion, cause a good deal of friction in connection with racehorses travelling from one State to the other, and would not do much good. He thought the proposal that veterinary examinations should be compulsory with all stallions whose services are offered to the public was premature so far as South Australia was concerned. It could not be carried out without considerably increasing their staff. Further than that, it was desirable that if anything was done in the direction indicated efforts should be made to secure uniform action throughout the Commonwealth.

Col. Rowell said the Agricultural Society had given considerable attention to this subject, but it was a difficult one to deal with. He thought that before any action was taken the heads of the Stock Departments in the various States should confer and submit some scheme for uniform legislation. A resolution recommending the Hon. Minister to give effect to this suggestion was carried.

Angaston Branch of the Agricultural Bureau, in expressing appreciation of the efforts of the Government to encourage afforestation, suggested that steps should be taken to prevent the wanton destruction of immature timber, and also that in all new hundreds belts or areas should be reserved for the conservation of timber.

Professor Perkins said he was strongly in favor of this proposal. When reporting on the Pinnaroo district prior to its being offered for settlement

he recommended that belts of timber should be reserved, and was glad that this had been given effect to. It was resolved that the Board indorse the suggestion and submit the same to the Hon. the Minister.

The Secretary Royal Agricultural Society wrote that the question of establishing a stud-book for draught horses was receiving the attention of the Agricultural Committee.

In connection with complaints of overcrowding of the dining-room on the occasion of Farmers' Day at Roseworthy College it was resolved to recommend to the Hon. Minister that in future arrangements should be made for a caterer to undertake the work of providing lunch, and that visitors should pay for same.

The Secretary reported that Rhine Villa Branch had been closed.

The following gentlemen were approved as members of Branches :— Messrs. M. Britza, Quorn ; S. L. Norman, Penola ; H. Fielder, J. C. Newbold, H. L. Heitmann, and F. Siebert, Yorketown.

Mr. Miller called attention to proposal of the Chamber of Manufactures to establish a memorial to Mr. Ridley, the inventor of the stripper. He moved that the Board heartily supports the proposal. He regretted that the Agricultural College movement to erect a statue at the College had not been successful.

Professor Perkins said that the College proposal was intended to commemorate the twenty-fifth anniversary of the opening of the College, and at the same time the services rendered by Mr. Ridley to the State. The response from the farmers of the State had been practically *nil*, but with the money subscribed by old students and friends of the College he believed they had sufficient funds to provide a marble bust of Ridley, to be erected inside the College building. The resolution supporting the proposal of the Chamber of Manufactures was carried.



ROSEWORTHY AGRICULTURAL COLLEGE.

HARVEST REPORT, 1910.

By WALTER J. COLEBATCH, B.Sc. (Agric.), M.R.C.V.S., Acting Principal.

(Continued from page 677.)

OATS.

On the western side of Grainger's C a block of 22.568 acres was sown with Calcutta oats procured from the Mount Gambier district. The history of this field will be found in the notes on the wheat harvest. In connection with the oat crop it is important to draw attention to the presence of a large number of extensive claypans on the area that we are now concerned with. Right through the winter and early spring these depressions remained in a more or less sodden condition. Patches of the crop died out altogether, and much of what remained was so weakened that it was scarcely worth the harvesting. On the better drained parts the crop grew well, and it withstood the rough weather splendidly. As soon as the seed bed was ready superphosphate (2cwts. per acre) was drilled in, and 12 days later (the 2nd of May) 4.628 acres were broadcasted with 90lbs. of seed and then scarified and harrowed. The remaining 17.94 acres were then cross-drilled with seed (80lbs. per acre), the scarifier going ahead of the drill. Germination was patchy, and later on the young plants assumed the sickly appearance characteristic of crops growing on cold, wet, soggy land. Those parts that survived the winter soaking came through the spring and early summer months fairly well. The crop was cut early, and fortunately dull, showery weather prevailed during the harvesting operations, so that very little loss, resulted through the grain shaking out. From the appended table of yields it appears that the drilled crop returned over 3bush. per acre more than the broadcasted. However, it should not be overlooked that by broadcasting the crop an appreciable amount of time is saved, and during the seeding season it may well be said that "Time saved is money earned." Two small plots of Algerian and Champion oats were experimented with in Field No. 60. They developed a surprising amount of flag and straw for this district, but suffered very severely indeed from red rust, and consequently did not set at all well in the heads. The general average yield over the whole area under oats, viz., 24.60 acres, was 28bush. 15lbs. This is 6bush. above the yield obtained in 1908, but falls a long way below the yields recorded in other seasons. In the subjoined table are given the yearly returns since 1905, but owing to the failure of the crop in 1907 it is impossible to include an average return for a continuous series of years.

TABLE VI.—*Showing Average Yields of Oats on College Farm from 1905 to 1910.*

Year.	Rainfall.	Area under Oats.	Yields per Acre.
	Inches.	Acres.	bush. lbs.
1905	16.71	20.00	43 10
1906	19.72	33.5	41 18
1907	15.05	20.00	Failure from feeding off
1908	17.74	20.00	22 28
1909	23.05	23.52	43 19
1910	23.87	24.60	28 15

WHEAT.

The results of the individual plots in the permanent fields are not dealt with in this report, as a full account of this section of the season's work will probably be issued as a separate report during the current year. Last season's farm wheat crops were sown in the following paddocks:—Grainger's A, Grainger's C, The Island, Field No. 6c, Field No. 6A, and Ebsary's C. As already pointed out, however, the last-mentioned field and about five acres of the island had ultimately to be cut for hay.

GRAINGER'S A.

This field was cropped in 1907, and was under grass when the College took possession of it early in 1909. It was fallow ploughed 7in. deep in June and July and then worked down. In the latter part of March it was turned over with a multi-furrow skim plough and harrowed. Weeds then grew apace, and on the 13th of May it was again skimmed and then rolled and harrowed to a moderately fine tilth. The saturated condition of soil made it impossible to catch it in good working order in every instance, and consequently the seedbed was not as fine and mellow as it should have been. Sowing was delayed and frequently interrupted, although drilling began on the 14th of May, the paddock was not shut up till the 8th of June. Three different varieties of wheat were sown, viz., Late Gluyas (selection 3), King's White (selection 4), and King's Red (selection 4), and the usual dressing of 2cwts. of mineral superphosphate per acre was also applied. Germination was tardy and the first growth very backward and uneven. About October the eastern side of the field began to pick up, and improved daily between then and harvest. The soil on the western side, however, is of a particularly adhesive nature, and seemed to lie cold and wet a good deal later in the season, which probably accounts in large measure for the comparatively low yield from the Late Gluyas block. Ripening was somewhat irregular, but the crop was singularly free from fungoid diseases. A slight amount of "takeall" was noticed in the King's Red plot. Harvest began about the middle of December, and was finished on the 6th of January, with the following results:—

TABLE OF YIELDS.—GRAINGER'S A.

Variety.	Area.	Seed per Acre.	Date Sown.	Yield per Acre.
	Acrea.	Lbs.		Bush. Lbs.
King's Red (selection 4)	11.465	86	June 8.....	20 0
King's White (selection 4)	12.512	86	June 7.....	18 23
Late Gluyas (selection 3)	29.984	81	May 14-19 ..	12 40
Whole Field	53.961			15 33

GRAINGER'S C.

In 1907 this field was fallowed, and the following season carried a crop of barley and oats. It was a stubble paddock when bought for the College, and was ploughed up in August and September, 1909. Odd portions of the field were too wet to carry the teams till the month of October, and the whole field was then skim-ploughed. It subsequently received two scarifyings (February and April), and was then broken down with the roller. About 45 acres of the best cropping soil in this field have been set apart for permanent experiments, and 22.5 acres were sown to oats. The balance (56.055 acres) was sown with a number of selected varieties of wheats and 2cwts. of mineral superphosphate per acre between the 7th and 21st of May. Two of them, viz., Klecfah and Federation, were grown from ordinary commercial seed; the former was sown to provide seed for next season's hay crop, and made magnificent growth—attaining an average height of over 6ft. The Federation plot was very dirty with charlock, and this, together with the numerous hard claypans, helped to spoil the yield. Nevertheless, it is impossible, in the light of past experience, to regard Federation wheat as a suitable variety for our conditions. It is quite possible that by the process of selection a type may be developed that will merit a place in the general cropping scheme of the farm; in fact, our own selected Federation and that grown in the Government wheat competition test have both given very much higher returns on the College farm than the ordinary seed on the market. It remains to be seen, however, whether a strain can be raised that will compare favorably with such wheats as King's Early and Gluyas in the district in which we are working. The southern end of the Jonathan, Marshall's No. 3A, and Marshall's No. 3B, and Carmichael's Eclipse plots suffered a good deal from winter flooding. A curious feature of the table of yields is the apparent deterioration of the variety College Comeback, in spite of careful selection. This, however, is only an apparent falling off in prolificacy, as will be evident when it is explained that practically the whole of the first selection was grown on land that was cleared three seasons ago, and up to last seeding had only carried one crop. It was therefore almost virgin land, whereas the block on which the second selection was sown had been used for cropping for a series of years. Generally speaking the crops in this field were vigorous and healthy, although a few "whiteheads" were observed in College Comeback (selection 2). The results of the harvest are appended.

TABLE OF YIELDS—GRAINGER'S C.

Variety.	Area.	Seed per Acre.	Total Yield.		Yield per Acre.	
			Bush.	Lbs.	Bush.	Lbs.
Jonathan (selection 1)	Acres. 6.48	68	96	50	14	57
Marshall's No. 3A (selection 2)	9.344	78	162	12	17	22
Carmichael's Eclipse (selection 2)	4.212	90	78	40	18	41
Marshall's No. 3B (selection 2)	3.468	78	68	52	19	51
College Eclipse (selection 2)	3.797	78	58	46	15	29
College Comeback (selection 2)	2.762	75	46	10	16	43
College Comeback (selection 1)	5.135	75	113	20	22	4
Federation	15.054	73	155	8	10	25
Kleefah	5.803	64	90	53	15	40
Whole Field	56.055		870	51	15	32

THE ISLAND.

The past history of this field, which was bought for the College in 1897, is given briefly below—

1897..... Bare fallow	1904..... Pasture
1898..... Wheat	1905..... Bare fallow
1899..... Pasture	1906..... Wheat, peas, and barley
1900..... Bare fallow	1907..... Bare fallow
1901..... Wheat and oats	1908..... Hay and wheat
1902..... Bare fallow	1909..... Bare fallow and pasture
1903..... Wheat and oats	1910..... Wheat.

About 100 acres of this field were ploughed 6in. deep in September and October, and the balance was lifted in the autumn. A large number of sheep and cattle was depastured on the field during the year. Preparatory to seeding the land was skimmed or disc ploughed in April, scarified and in part rolled in May, and then harrowed down in front of the drill. On the eastern side about 20 acres were drilled with 2cwts. of superphosphate on the 29th and 30th of April, and King's Red (selection 3) to the amount of 90lbs. per acre was broadcasted and covered by a spring-tooth cultivator and harrows on the 9th of June. The rest of the field was drilled with wheat and 2cwts. 36-38 per cent. superphosphate, the details of work being shown below. Seeding took place between the 1st and 16th of June under fair conditions, though the earlier sown plots on the lower part adjoining Island A went in rather wet. Growth was slow at first, and in July the flood waters scoured out channels through the crop and covered some of the lower blocks with inches of silt. Late Gluyas in particular seemed to suffer from the continual soakage of water from the higher levels. Except on the rise, where "takesh" threatened to ruin the yield, very little evidence of disease was noticed; but a lot of damage was done at flowering time by the low temperatures early in October, and by the continuous rough gales. From the yield table it will be noticed that, with the exception of the 4th and 3rd selections of Gluyas, the yields are unsatisfactory. Particularly is this so with the 4th selection of Late Gluyas. It should be mentioned, however, that this

plot was worked up later than any of the others, and evidently the seed bed was not sufficiently firm at the time of sowing. At all events it went down very badly, and a good deal of grain was left in the field. It was unfortunate that such a number of unfavorable circumstances should have arisen to prevent this variety from taking its proper place amongst the prolific wheats grown on the farm. During the last two seasons it has given an average return of 22.16 bush. per acre, and even this season the 5th selection (grown in another field) yielded 22 bush. 50 lbs.; so that this season's partial failure must in fairness be attributed to accidental circumstances and not to inherent deficiencies in the grain itself. The poorness of the returns from the plots on the eastern side of the paddock was brought about by the washing of the plant food beyond the reach of the roots by the winter and spring rains, and by the cold weather that prevailed at flowering time. A trial that is not without interest was made to test the system of broadcasting against drilling. The 3rd selection of King's Red wheat was used, and on the broadcasted area 90 lbs. of seed per acre were sown on the 9th of June. The manure for this plot (2 cwt. superphosphate) was drilled in on the 29th and 30th of April. The drilled area was sown with 85 lbs. of seed and 2 cwt. of superphosphate on the 10th June. There was not much difference to be seen in the growth during the season, but the result of the harvest revealed a difference of over 3½ bush. per acre in favor of the drilling. A single year's test, however, is not sufficient to decide an important matter of this kind, and it would be interesting to see a similar trial carried out over a series of seasons, as in the event of the discrepancy being small, it would probably pay to have a block drilled in early with manure, so that in the event of a late season one might have recourse to the broadcaster to relieve the pressure during the seeding operations. Cutting began on the 6th of December, but all the plots were not harvested on the same system. Some were hauled to the farm and threshed, others were gathered with a new harvester, and others again were taken off with a reaper-thresher. A synopsis of the yields is here given.

TABLE OF YIELDS—THE ISLAND.

Variety.	Area.	Seed per Acre.		Total Yield.		Yield per Acre.	
		lbs.		Bush. lbs.		Bush. lbs.	
Marshall's No. 3A (selection 2)	452	80	5	10	11	26	
Marshall's No. 3A (selection 1)	2-323	85	29	5	12	31	
College Comeback (selection 1)	1-796	85	28	0	15	35	
Marshall's No. 3B (selection 1)	6-211	85	99	35	16	2	
Carmichael's Eclipse (selection 1)	6-562	86	115	36	17	37	
College Eclipse (selection 1)	6-841	86	119	20	17	27	
King's White (selection 3)	5-168	85	57	38	11	9	
Late Gluyas (selection 4)	10-883	90	144	55	13	19	
Gluyas (selection 4)	4-063	81	127	18	31	20	
Gluyas (selection 3)	42-621	90	893	2	20	57	
King's Red, drilled (selection 3)	21-780	85	339	49	15	32	
King's Red, broadcasted (selection 3)	20-285	90	248	34	12	15	
King's White (selection 3)	5-168	85	57	38	11	9	
Whole Field	128-985	—	2,208	2	17	7	

FIELD NO. 6c.

This field contains about 23 acres of the original farm. The light-grey calcareous loam and the stiff, heavy clay soils are both represented in it, and the centre of the field is somewhat depressed.

Past history—

1895..... Oats	1903..... Wheat
1896..... Peas	1904..... Pasture
1897..... Wheat	1905..... Pasture
1898..... Pasture	1906..... Bare fallow
1899..... Bare fallow	1907..... Barley
1900..... Wheat	1908..... Pasture
1901..... Pasture	1909..... Bare fallow
1902..... Bare fallow	1910..... Wheat, oats, rye.

The hand-selected and hybridised varieties, as well as the smaller experimental plots, were placed in the middle of this field and were surrounded by larger areas of wheats, oats, and ryes. In parts the soil is of a light, rubbly nature, of a greyish color, and easy to work; other portions contain a much larger percentage of clay, and in wet seasons rapidly become waterlogged. With the approach of warm weather, this class of land bakes up quickly and tends to crack. To a considerable extent last season's crop suffered from these causes, but more important in this field was the damage due to "takeall." The effects of the fungus was especially noticeable on the light-grey soil and along the headlands. Red rust also ran riot in the oat crops. Fallowing took place in September, and the land was thoroughly worked with the disc cultivator in October. It was harrowed down early in the following month, and scarified again in January. From the 10th to 12th of February it was cross worked with the scarifier, and received a third cultivation in April. The area sown to hand plots was rolled from the 21st to the 25th of April, and the whole field then scarified preparatory to seeding; 2cwts. superphosphate per acre were drilled in over the whole field and seeding operations were effected between the 16th of May and the 15th of June. A good germination was followed by steady growth up to the time of heading; but all hopes for a satisfactory harvest were abandoned early in the spring, for not only were a number of patches drowned right out, but in addition the "takeall" scourge became so bad that had it been an ordinary crop instead of a number of selected varieties it would have been cut for hay. Included amongst the wheats was a new variety named Dymenos, forwarded by Professor Perkins from Greece. It has a bearded head, and is said to be a very rapid grower and quick to ripen. It was sown on June 15th and was ready for stripping about Christmas time; however, it would hardly be right to adjudge it by this season's results. The ryes made splendid growth, but, as in former years, they failed to yield a high return of grain.

The plots were stripped and winnowed between the 10th of December and the 6th of January.

TABLE OF YIELDS—No. 6c.

Variety.	Area	Seed per Acre.	Total Yield.	Yield per Acre.
	Acres.	Lbs.	Bush. Lbs.	Bush. Lbs.
Federation (selection 1)	·487	85	2 29	5 6
Viking (selection 1)	·414	85	3 28	8 22
Marshall's Pride	·752	85	4 29	5 57
Marshall's Unification	·770	85	5 29	7 6
Marshall's Unity	·660	85	5 33	8 23
Marshall's Combination	·748	85	8 14	10 59
Marshall's Dorath	·625	85	8 2	12 49
Marshall's Prolific	·649	85	7 1	10 45
Hardy's Elation	·930	85	8 40	9 19
Richter's Eminence	·953	85	7 38	8 0
Crossbred 73	·839	85	5 19	6 20
Petatz Surprise	·564	85	6 3	10 44
Soory	·625	85	3 58	6 21
Dymenos	·039	85	0 32	13 41
Whole Wheat Area	9·055	—	76 55	8 30
Ryes—				
March	·219	65	3 17	15 0
Multicaule	·219	65	2 36	11 52
Giant Winter	·219	65	2 35	11 48
Schlanstedt	·219	65	3 7	14 14
Whole Rye Area	·876	—	11 35	13 13

FIELD No. 6A.

This field also contains a large number of comparatively small plots. It comprises about 35 acres, and its past history is as follows:—

1895..... Oats	1903..... Wheat
1896..... Peas	1904..... Pasture
1897..... Wheat	1905..... Bare fallow
1898..... Pasture	1906..... Ensilage crop
1899..... Bare fallow	1907..... Kale
1900..... Wheat	1908..... Barley
1901..... Pasture	1909..... Bare fallow
1902..... Bare fallow	1910..... Wheat and barley

The soil is a heavy clay loam, and requires careful handling. The first ploughing was started on the 30th June and finished nine days later. The field was cultivated in October and again in February. Towards the end of May it received the final scarifying, and was then drilled with various grains and 2cwts. of superphosphate per acre. This field cannot be said to have brairded well; yet, with the exception of the French wheats, it came along nicely through the winter, and made steady growth throughout the spring. It suffered a little from red rust, and two plots, viz., Correll's No. 5

and Flinders, were so badly bunted that it was deemed unwise to harvest them. The rest of the plots reached maturity in a fine healthy state, and the yields throughout the field were, with one exception, uniformly good. The variety known as Lambda, however, shed its grain so badly that very little remained to be stripped, and the yield was in consequence disappointingly low. The paddock was stripped between the 6th and 31st of December, and the plots yielded as follows :—

TABLE OF YIELDS—FIELD NO. 6A.

Variety.	Area.	Date Sown.	Seed per Acre.	Yield per Acre.
	Acres.		Lbs.	Bush. Lbs.
Bearded Rieti	·435	June 4	85	20 47
Cape Wheat (selection 1)	·177	" 4	85	21 14
Tresor	·056	" 4	85	15 40
Grosse tete	·056	" 4	85	22 37
Bordier	·056	" 4	85	25 18
Lamed	·056	" 4	85	22 1
Champlan	·056	" 4	85	27 5
Briquet jaune	·056	" 4	85	25 18
Dattel	·056	" 4	85	27 57
Bon Fermier	·056	" 4	85	30 39
Massy	·056	" 4	85	24 42
Ble d'Australie	·056	" 4	85	30 30
Le Huguenot	·741	" 6	85	17 15
Hmeerah	·604	" 6	85	21 18
Ahweedjah	·612	" 6	85	16 37
Mahmoudi	·580	" 6	85	30 1
Adjini C	·258	" 6	85	21 50
Jonathan (selection 2)	2·175	" 7	85	24 1
Marshall's No. 3A (selection 3)	1·152	" 7	85	25 52
King Fan (selection 1)	·419	" 7	85	27 11
Marshall's No. 3B (selection 3)	1·273	" 7	85	26 39
K. VIII. (selection 1)	·177	" 7	85	34 48
Federation (selection 2)	·822	" 7	85	25 48
College Comeback (selection 3)	·749	" 8	85	29 12
Fan (selection 5)	·145	" 8	85	25 3
Viking (selection 2)	·113	" 8	85	30 49
Late Gluyas (selection 5)	·523	" 8	85	22 50
Carmichael's Eclipse (selection 3)	·652	" 8	85	28 21
Lambda (selection 5)	·862	" 8	85	10 40
College Eclipse (selection 3)	1·007	" 8	85	25 8
King's White (selection 5)	1·442	" 8	85	23 27
Gluyas (selection 5)	·741	" 8	85	21 29
King's Red (selection 5)	1·463	" 9	85	22 43
Bearded Gluyas (selection 5)	1·365	" 9	85	20 51
Lambda (selection 4)	·201	" 9	85	13 6
Bobs	·009	" 11	85	35 11
Sutton's Prolific	·014	" 11	85	28 34
Unknown E	·023	" 11	85	20 40
Whole Field	19·297	—	—	23 19

COMPARISON OF YIELDS OF CHIEF VARIETIES.

Many interesting facts are revealed in the table of comparative yields of the more important varieties grown at the College since 1904. In the

final column is given the means of the average returns obtained, and it will be observed that what has already been said with regard to Federation is strikingly borne out. The mean average yield from this variety under Roseworthy conditions is but 13.45bush., whereas even such a comparatively shy yielder as College Comeback has returned on the average 16.25bush. per acre every year. Although this season's results have in the case of all varieties, save two, tended to reduce the means, still it will be very generally conceded that, with the exception of Federation, the figures are even now very satisfactory. In working out the mean returns for King's Red and King's White the yields recorded, prior to the subdivision of King's Early, have not been taken into account.

TABLE VII.

Rainfall: Inches—		1904.	1905.	1906.	1907.	1908.	1909.	1910.	Means of Average Yields.
		14.70	16.71	19.72	15.05	17.74	23.05	23.87	
No.	Variety.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
1	King's White }	20.07	23.08	16.01	33.17	27.51	26.25	19.88	26.70
2	King's Red }				32.10	25.58	26.73	15.47	24.97
3	Bearded								
	Gluyas...	—	—	—	30.82	22.88	19.14	20.85	23.42
4	Gluyas.....	20.71	23.64	12.99	22.77	23.46	21.98	21.85	21.05
5	Jonathan ...	14.17	19.83	33.63	21.75	16.38	18.18	17.20	20.16
6	Carmichael's								
	Eclipse ..	17.89	19.45	26.10	16.03	21.75	17.77	18.61	19.65
7	College Eclipse	—	—	—	—	23.23	17.73	17.47	19.47
8	Marshall's								
	No. 3B...	—	—	—	—	20.20	18.79	18.48	19.16
9	Late Gluyas.	—	—	—	—	23.36	20.96	12.97	19.09
10	Marshall's								
	No. 3A...	—	—	—	—	21.41	18.32	17.05	18.93
11	College Come-								
	back	15.89	13.77	17.93	11.27	19.81	15.03	20.05	16.25
12	Federation ..	—	—	—	18.87	10.55	—	10.93	13.45

GENERAL WHEAT RETURNS.

In reviewing the wheat returns as a whole, and comparing them with last year's results obtained with a rainfall of 23.05in. as against 23.87in. this season, the all-importance of the distribution of the rainfall is at once apparent. It is not so much a matter of the total precipitation for the year, or even for the separate months, that influences the yield to the greatest extent, but it is to the daily distribution that we must look for the real explanation of variations in yields under approximately equal rainfalls. Seasons like the one that is just over, that are characterised by continuous spells of relatively light showers, together with low temperatures, must always be expected to give lighter returns than those in which an equivalent amount of rain has fallen in less time and in which the average daily temperature has been more stimulating to plant growth. Herein lies the real explanation

of the difference between the farm averages for the years 1909 and 1910. The secondary factors, such as undue leaching of the land, drowning out, water-logging of the soil, and the development of various fungoid pests, are primarily dependent on the weather conditions here referred to; and, whilst their influence has been exaggerated during the past season, they are to a certain extent always evident, and cannot therefore be regarded as being of more than secondary importance. The total area under wheat this season, exclusive of the permanent experimental plots, was 267·353 acres, and the average yield was 16bush. 38lbs. per acre. The mean of the average returns per acre obtained for the six years immediately preceding the season 1910 is 19bush. 34lbs., so that last season's figures are 2bush. 54lbs. lower than the normal yield. If the permanent experimental fields be included the acreage under wheat becomes 328·835, and the average yield for the whole area is 17bush. 26lbs. This is by no means a low return, and will compare very favorably indeed with the general average for the district.

TABLE VIII.—*Showing Average Yields of Wheat on College Farm from 1904 to 1910.*

Year.	Rainfall.	Area.	Average Yield.	
	Inches.	Acres.	Bush.	lbs.
1904	14·70	330·00	18	3
1905	16·71	212·00	24	11
1906	19·72	318·00	14	30
1907	15·06	178·00	13	20
1908	17·74	258·52	22	14
1909	23·05	328·47	25	5
1910	23·87	267·35	16	38
Mean 1904-1909	17·65	—	19	34
Mean 1904-1910	17·89	—	19	9

SUMMARY.

In conclusion, it may be said that the harvesting operations have been carried out rather more expeditiously than usual, owing to the Hon. the Minister of Agriculture having consented to the purchase of a Sunshine harvester and one of the Massey-Harris reaper-threshers. As it so happened that the paddocks at the two extremes of the farm were in crop this season the harvest would have been unduly protracted had it been necessary to cart every sheaf to the thresher. Mr. W. J. Spafford (Assistant Experimentalist) and Mr. J. P. Richardson (Farm Superintendent) deserve warm commendation for the very thorough way in which they have carried out their respective duties, and for the assistance they have rendered in the preparation of this report.

ANALYSES OF FERTILISERS.

By W. L. SUMMERS, Inspector of Fertilisers.

The following results of analyses of samples of fertilisers, taken during the past few months, are published for general information. In each case the certificate of constituents or guarantee registered by the vendor is shown in parantheses, thus (36 per cent.), immediately before the results of the analyses :—

Adelaide Chemical and Fertilizer Company, Limited—Mineral super., water-soluble phosphate (36 per cent.), 38.5 per cent.

Adelaide Chemical and Fertilizer Company, Limited—Guano super., water-soluble phosphate (25 per cent.), 25.2 per cent; citrate-soluble phosphate (5 per cent.), 10.5 per cent.

Bagot, Shakes, & Lewis, Limited—Japan super., water-soluble phosphate (38 per cent.), 43.3 per cent., 41.7 per cent.

Dalgety & Co.—Super., water-soluble phosphate (36 per cent.), 37.9 per cent.

Elder, Smith, & Company, Limited—Lawes' super., water-soluble phosphate (36 per cent.), 36.5 per cent.

Farmers' Co-operative Union—Superphosphate, water-soluble phosphate (39.75 per cent.), 39.75 per cent.

A. H. Hasell—Superphosphate, water-soluble phosphate (38 per cent.), 40.6 per cent.; "Jap" super., water-soluble phosphate (38 per cent.), 48 per cent., 41.8 per cent., and 40.1 per cent.

Mount Lyell Mining and Railway Company, Limited—Standard super., water-soluble phosphate (36 per cent.), 41.4 per cent.

Norman & Co.—Super., water-soluble phosphate (36.89 per cent.), 36.6 per cent.

Wallaroo Phosphate Company—Super., water-soluble phosphate (36 per cent.), 39 per cent., 42.7 per cent.

Wills & Co.—Concentrated super. (90 per cent.), 93.40 per cent.; Globe super. (36 per cent.), 37.5 per cent.

AGRICULTURAL BUREAU CONFERENCE.

UPPER NORTHERN BRANCHES.

The Annual Conference of the Upper Northern Branches of the Agricultural Bureau was held at Quorn on Tuesday, February 14th. There were present the Hon. the Minister of Agriculture (J. P. Wilson, M.L.C.), the Hon. the Commissioner of Crown Lands (C. Vaughan, M.P.), and the following delegates:—Messrs. E. C. Brice and M. Robertson (Coomooroo); W. Robertson and J. Schuppan (Wilmington); W. Robertson (Orroroo); T. Griffin, M. Corcoran, and W. Gum (Amyton); A. and M. Eckert, C. Pearce, and —. Hannemann (Arden Vale); D. E. Madigan and —. Stone (Hookina); J. Paterson (Craddock); A. Smoker (Davenport); R. Thompson, F. Noll, J. McColl, C. Patten, F. W. Schultze, and J. Finley (Quorn). The Department of Agriculture was represented by Messrs. A. E. V. Richardson, M.A., B.Sc. (Acting Director of Agriculture); W. L. Summers (Secretary of Advisory Board of Agriculture); G. Quinn (Horticultural Instructor); P. H. Suter (Dairy Expert); and D. F. Laurie (Poultry Expert). Mr. J. F. McEachran, M.R.C.V.S. (Government Veterinary Surgeon), was also present.

Mr. Robert Thompson (Chairman of the Quorn Branch) presided, and welcomed the members of the Government and delegates who were present. He regretted the small attendance, but hoped the result of the day's Conference would be beneficial to all. Conferences of this kind involved expense to the Government, and it behoved farmers to give their heartiest support.

The Minister of Agriculture said that while it had been a rather difficult matter for the Commissioner of Crown Lands and himself to attend, they had come to help all they could and to encourage delegates in their work. He hoped solid work would be done in the interests of the farming community. Conferences entailed some expense as far as the State funds were concerned, but so long as they were well attended and thoroughly instructive the end was achieved. The Government was doing a great deal of work that future Governments must continue—work which was directly in the interests of the farming community. It was opening up new districts and establishing experimental farms, with the idea of saving the new settlers time and money, and these farms were also helping the man already on the land. Farmers could profit by watching the scientific work done by the departmental experts, and the present Government was following on in the course outlined

by some of its predecessors in establishing centres of rural education. Feeling the need of a man at the head of the Agricultural Department who had the confidence of the Government and the State, they had secured the services of Professor Lowrie, who possessed the entire confidence of 90 per cent., if not more, of the producers. This gentleman gave great satisfaction when previously in South Australia, and his experience in New Zealand and Western Australia had made him even more an acquisition to this State. Professor Lowrie for 13 years in South Australia had strongly advocated the use of superphosphate, and the bountiful harvests that had been reaped in dry areas during the past years were striking evidence of the soundness of his teaching. In South Australia 12 years ago only 12,500 tons of fertilisers were used, the area treated was 250,000 acres, and the total yield of wheat was 8,778,900 bush. Last year 87,000 tons of fertilisers were used on 2,320,000 acres, and the yield had increased to from 20 to 25 million bushels per annum. The Government had decided to make a trial of shipping clean graded wheat in bulk. A site for an elevator, &c., had been chosen at the Outer Harbor, and plans and estimates were being obtained from various parts of the Commonwealth. The matter was in the hands of a South Australian engineer, and in a few weeks he expected to have a full report on the matter. He could promise that the elevator would be in full swing for the 1911-12 harvest. Referring to the operations conducted at the Parafield Experimental Farm in the hybridising and crossbreeding of wheat, he emphasized the importance of the production of first-class seed. That the producers were becoming increasingly impressed by the advantages of using superior seed was indicated by the fact that this year the supply at Parafield had been applied for 10 times over. With a view to meet the demand, the Government had determined to establish a farm at North Booboorowie, at which seed wheat would be grown in bulk for the Northern farmers.

The Commissioner of Crown Lands, in a brief speech, said that a great deal could be done, especially in the drier areas, in the direction of irrigation. It was desirable, however, that the methods of conservation and reticulation should be cheap. He believed that when the Murray was locked millions of people would settle along its banks.

HOMESTEAD GARDENING.

The Horticultural Expert spoke on "Homestead gardening." It was not generally realised how greatly horticultural operations influenced even the national life of the people. Looking at the subject from the view points of the mental stimulus received through the practice and the actual monetary value of it, he had been struck by the comparative absence of attempts to brighten homestead surroundings by means of gardens. The extension of irrigation schemes would tend to increase the popularity of the pursuit. Much more, however, might be done to beautify the home, even without

such an aid. One of the principal explanations of the scarcity of farm gardens probably was that the majority of the men on the land regarded their properties only as temporary abodes, and therefore did not feel disposed to plant for future generations. In making a garden it was absolutely necessary first to select a suitable site on the best soil available and near the water supply, and then securely fence the plot to keep out vermin and domestic animals. It was advisable to plough the soil deeply, and, if possible, to subsoil it. He deprecated the tendency of Australians to cut down trees, and when planting to ignore the merits of indigenous trees. The *sterculia*, sugar gum, native pine, *causuarinas* (shea-oaks, &c.), and other native trees and shrubs made handsome growth, and their cultivation along with other hardy trees, such as Aleppo pine, olives, tamarisk, and *Schinus molle* (pepper tree) might be successfully attempted in dry areas, even where flowers did not flourish. The best time to plant was in the autumn, while the ground was still warm. When buying young trees it was a good plan to choose those between 6in. and 9in. high, as it was almost certain then that the root systems would be in good order; but if only a few were required it was best to plant seeds. A capital method of raising seedlings was to burn the bottoms out of jam tins, place the cylinders in a sheltered spot, and fill them and the interstices with sifted soil made up of equal parts of loam, sand, and thoroughly rotted manure. This should be pressed down, two or three seeds should be buried in each tin, and water applied. In planting a cutting, say, 12in. long, 11in. should be below the surface and 1in. above the ground. Plantations in dry areas should be deep-ploughed, or dug so that all the water possible could be intercepted and drained into them, to be retained by tillage, keeping a loose mulch of surface soil. For standing dry seasons he preferred such fruits as the almond, the fig, and the grape vine. Pears and quinces were also useful. Vegetables should be grown on land deeply dug and carefully cultivated. He advocated raising seedlings such as cabbages, tomatoes, etc., in pots, and their subsequent transplanting at distances which would allow of expansion. It was better to put in 100 cabbages and give them sufficient space and attention than to put in 500 and lose all but 50. He congratulated the local growers on the excellent quality of the fruit displayed in the hall.

Mr. W. L. Summers emphasized the fact that in districts where trees would not grow the larger saltbushes would form excellent hedges and bushes. Some of these made good ornamental trees. It was a pity that the bluebushes had been destroyed in thousands to make room for wheat. This bush would be found invaluable if planted on the bare plains between Hammond and Wallaway, and much better results would be obtained in a garden where a hedge of this plant formed a shelter and breakwind. Farmers should fence off poultry yards, as otherwise the fowls would do as much damage in the garden as the rabbits. A great deal of water was thrown away from most

houses which could easily be saved in kerosine tins and given to the thirsty plants in the hot weather. In this way plants which would otherwise perish could be kept going through the summer.

In reply to a question Mr. Quinn said olives could be raised from seeds. The pulp should be removed from the stones before planting. In a dry district it would be wise to leave the seedlings in their original positions, where the roots naturally went down. Approved varieties could then be budded on.

LAND SETTLEMENT ON THE MURRAY.

Mr. C. E. Pearce, of the Arden Vale Branch, gave an address on "Land Settlement on the Murray." He considered that the locking of the River Murray was justified, as it would ultimately become a source of wealth greater than all the goldfields of the West. During a recent trip along the mighty stream he had been particularly interested in the reclaimed swamps. A lot of grumbling was heard among the residents there, but as everything was in the experimental stage that was not altogether surprising. Personally he had great faith in the swamp lands, as they were near to the railway, and on them could be grown excellent root crops and different fodders necessary in dairying, stock-raising, and lamb-fattening. He preferred the prospects of the reclaimed swamp areas to those of the fruit-growing settlements further up the river. At the same time he was bound to admit that the Waikerie and Berri settlements appeared destined to be most progressive and successful, but either a railway or permanent navigability of the river was essential.

HOW TO BREAK IN CARRIAGE HORSES.

A paper dealing with this subject, prepared by Mr. J. F. Kildca, of the Coomooroo Branch, was read by Mr. E. Brice. [This paper was originally read before the members of the Coomooroo Branch, and will be found on page 801 of this issue.—ED.]

NEXT CONFERENCE.

On the motion of Mr. Brice it was decided to hold the next Conference of Upper North Branches at Orreroo.

PRIZES FOR WHEAT AT SHOWS.

Mr. J. McColl (Quorn) drew attention to an article which appeared on page 612 of the January issue of the *Journal of Agriculture*, dealing with the subject of prizes for wheat and other produce offered by the various agricultural societies. He thoroughly agreed with the writer (Mr. W. L. Summers) that cereal exhibits were not adequately encouraged, and he moved that a recommendation be sent from this Conference to the various agricultural societies to offer prizes for plots grown in their immediate districts; points to be given for yield and quality. The proposal was seconded by Mr. C. E. Pearce (Wyacca).

Mr. Summers said that the prizes offered for wheat were altogether out

of proportion to the importance of this product. The prosperity of South Australia was dependent more upon wheatfarmers than any other section of the community, and yet the agricultural societies gave mere pittances as prizes for wheat and other agricultural products compared, for instance, with sums given for ring events. The fault lay not so much with the societies as with the farmers themselves and the members of the Agricultural Bureau, who had undoubtedly manifested a lack of interest in the cereal and similar exhibits at the shows. In Victoria competitions such as this suggested in the resolution created great interest, and he sincerely hoped that something would be done in the direction indicated in South Australia. Other speakers supported the motion, which was then carried unanimously.

VISIT TO FRUIT GARDENS.

After lunch a number of delegates visited some of the local fruit gardens to further chat over orchard and garden problems with the Horticultural Instructor.

POULTRY INDUSTRY.

The afternoon session, which was delayed until 4 p.m. on account of local stock sales, was opened by an address from the Poultry Expert. He found that numbers of farmers still considered mongrel fowls the best layers. As a matter of fact to obtain the best results only pure-bred birds should be kept. Farmers did not fully recognise the value of the egg-laying competitions in this State, which had established world's records and had brought inquiries for birds from England, America, and India. Years ago on the Murray Flats many farmers had depended on poultry for a living. Wheat-growing in later years had been so profitable, however, that the poultry industry had not received the attention it deserved. Last year's exports in eggs alone brought no less than £20,000 into South Australia, and in addition to this large quantities of eggs were sent away in the form of pulp. There was a large trade in Western Australia and Broken Hill in table poultry. The value of strain as demonstrated by egg-laying competitions could not be overlooked. There was great need for the selection of breeding stock of the modern utility breeds. For some months of the year there was an excellent demand for young table birds in local markets, and there was also room for an oversea trade. Therefore farmers would find additional profit in birds that would produce a reasonable number of eggs and a class of progeny suitable for the table. Eggs were required which had a good shell. The infertile egg was the best keeper. There was no excuse for keeping a stock of roosters except for breeding purposes. A hen ceased to be profitable as an egg-producer after the second year's laying. Fowls should be marketed as soon as ready; otherwise the balance of profit was lessened. Farmers should keep an account of the quantity of wheat, milk, &c., used in fattening chickens. Trade requirements in Adelaide were for fat young chickens

from 2½lbs. to 4½lbs. in weight. If good chickens were sent to the Produce Depot in Adelaide they would be sold on behalf of the owners. Lucerne plots were invaluable for poultry-breeding, while South Australian wheat was superior in feeding value to hard grains grown in other countries. Practically the whole of the State was suitable for poultry production. Housing accommodation free from vermin and breakwinds were essentials to success. Houses should be of iron with straw on top in summer. Where foxes were bad a few shillings spent in wire netting afforded cheap protection. It had been a reproach to the State that for years they had been placed under disabilities in the export of birds to Victoria because they had made no effort to exterminate the tick pest. He asked all owners to do their best to destroy the parasite by the use of poison or kerosine dips, and by using approved houses. Prevention of disease was possible by housing properly, feeding well, and maintaining a pure water supply. By a system of double yards and the rotational planting of rape, the soil could be kept sweet and clean. Caponising was not a method offering commercial advantages. It was preferable to fatten cockerels and sell them within 14 weeks.

DAIRYING AS A FARM ADJUNCT.

The Dairy Expert delivered an address on the dairying industry, and referred to the evident progress made during the past few years. In 1903-4 5,995,750lbs. of butter were manufactured worth, say, £250,000. Last year 8,482,000lbs. of butter were made, worth, say, £353,500, while for 1910-11 returns showed 10,000,000lbs. of butter valued at about £430,000. Last year South Australia exported 33,500 cases of butter weighing 1,876,000lbs., and this year the figures would reach 64,000 cases, or 3,360,000lbs. weight. This increase was not altogether due to the policy of the Government in placing thousands of industrious people on the land, but also to the rural population adopting better methods and working under more favorable climatic conditions. The South Australian dairying industry was worth well over half a million sterling annually, including cheese, milk, and cream consumed by the populace, but not including the milk fed to that valuable animal, the pig. There was still abundant room for expansion, and this depended largely upon the farmer himself. Generally speaking, farmers had not given the question of breeding cows the consideration it deserved. Every dairyman could not be a great breeder, for few men possessed that accuracy of eye and judgment so essential. Great improvements had been made by men possessing a sound knowledge of the laws of breeding and feeding. These two must go hand in hand for the best results. Farmers could secure bulls from recognised breeders of pure dairy stock. A bull to place at the head of a herd should possess purity of blood, constitution, and external indications fitting him for the purpose for which he was required. He should also have on both sides a long list of ancestors which

had good dairying records. A sire of this description would invariably bring about an improved yield and type. They should secure such bulls and mate with crossbred cattle. Then when the heifers were of age for breeding, procure another bull of the same breed, and not see-saw in breeding by first using a Shorthorn, then a Holstein, and then a Jersey. It was a mistake to use crossbred bulls or mongrels. They might by accident get a good heifer or two, but as a rule they did not transmit any good quality, but rather their bad traits to the offspring. He would advise the use of cows selected on individual merit and a pure bull. Then carefully select the best heifers on their second calf and dispose of those not coming up to the standard. In a few years the production per cow per annum and the profits might be increased from 50 per cent. to 100 per cent. under proper dairying methods. Fully two-thirds of all food consumed by a cow was utilised in maintaining the system of life. No matter how good a cow, or how excellent her record as a butter or milk maker, she could not make milk to profit unless liberally and judiciously fed. Food must be nutritious and palatable. The relative cost of foodstuffs was not always in accordance with its milk-producing properties. Expensive foods might be fed and yet no better results be secured than by feeding a cheaper ration containing the milk-making nutrients. Thus it was well for dairymen to possess a knowledge of the food value of various foodstuffs at his command. Ensilage was excellent milk-producing food and a preventive of "dry bible." The more food a cow consumed in a given time, yielding milk accordingly, the better cow she was for a dairyman. Where possible, root crops should be grown, and every cowkeeper should have a small patch of lucerne. He could sow, say, 5lbs. of lucerne seed with some wheat in about 10 acres of land, and under favorable conditions would get a beautiful cutting of milk-making hay. Lucerne would continue to grow after every summer shower, providing succulent milk-producing food. Lucerne-growing would considerably reduce the bran bill upon the farm. Bran now cost £6 10s. per ton. Well-cured, full-leaved lucerne hay was almost equal in value as a milk-maker, and had been recognised as the king of dairy fodders for over 50 years. He would recommend farmers to make early sowings of rye and barley crops for early winter feed. All rations fed to cows should possess salt, as it assisted digestion and made for better health of the herd. Milking should be done quietly and in a clean manner for the production of good dairy products. If milk or cream possessed inferior flavor the butter or cheese would be similarly affected. Cleanliness should be rigidly observed. The udder should be carefully wiped, the hands washed, and the milk drawn into clean buckets and strained. Milk should be taken as soon as possible from the shed to the separating-room, and separating should be done at once, for then the milk was in a condition to allow of the removal of the maximum of fat. Cream should be placed in clean utensils, all of which had previously

been scalded and rinsed out with limewater, each separating being kept separate until temperatures were about even. Warm cream added to that which was cooler set up a more rapid fermentation, and the cream if kept long invariably arrived at the factory in a too far advanced stage to allow of good butter being made. Farmers should protect cream from dust, mice, flies, &c., by covering it up with butter cloth. Place it in the coolest place or in a draught, with a wet bag wrapped around the can and keep it wet. They should deliver three times a week, and when on the road to the nearest railway station the cream should be covered with a piece of white calico or canvas placed 15in. or 2ft. over the top to allow of a draught. The wet bags should still be used. Preservatives were to be condemned. He did not favor the practice of adding chemicals, powders, or liquids of any sort to cream or milk. They were a source of danger to manufacturers of butter and cheese. He had found it necessary this season to prevent the shipment of some butter on account of its containing too great a percentage of boracic acid. Some 700 cases had been confiscated on account of excess of moisture and preservatives. The manufacturers blamed the farmers, and so did he, for a lot of the trouble. If they would cool the cream, adopt scrupulously clean methods, and deliver the cream early they would have done their part in the production of better dairy products, and they would undoubtedly gain more remunerative values.

IRRIGATION IN THE NORTH.

The following paper on this subject was read by Mr. W. Robertson, of Wilmington Branch :—“ We have an excellent object lesson in the Pekina Creek Irrigation Scheme at Orreroo, and, although only in its infancy as regards developments, the chief factor to success, *i.e.*, the water, is in splendid evidence. The dam overflowed several times last year, and now, after two months' use by the colony, it is only down about 3ft., leaving still 47ft. of water available. I have always argued that no irrigation colony would be safe unless the water was obtained from a permanent stream or an artesian source; but I have modified my opinion lately, and believe that a dam constructed in a good catchment area with a fair rainfall, and the water put on the land through sprinklers at the rate of about 14in. per acre per annum, gives reasonably sure prospects. The celebrated Mundaring Weir, which supplies Kalgoorlie, etc., in West Australia, is a dam 100ft. high across a river channel which is dammed back for eight miles, and so permanent is the supply that the Government has no fears for the future population of the goldfields, and the price charged is satisfactory to the consumers, although the cost of pumping the water 300 miles must be very great. At the Pekina colony lucern-growing for dairy stock and fattening are the main objects in view, and this splendid fodder plant is already showing how suitable the soil is for its growth. The Government agrees to give the land 12in. of water, and with the rainfall

of 10in., making 22in. in all, the colony should be a success. The grazing capacity of lucerne, cut and fed to stock, is about 10 cows to the acre, and as no industry pays better than dairying, the blockers at Orroroo have very fair prospects. Now, what is being done at Orroroo can be done at a number of places between Melrose and Hawker, for the water that could be conserved from the Flinders Range is unlimited. Look what the flood waters of the Willochra have done for Kallioota. There quite 7,000 acres are flooded two or three times a year through the aid of a few embankments and drains. Those 7,000 acres carry more stock than 20 times the area of the unirrigated country. This Willochra is capable of watering thousands of acres ere it reaches Kallioota, and at very little expense. Then look at results from the overflows of the Boolcunda Creek. If a similar dam to the one at Orroroo were constructed up in the hills, quite 4,000 acres of country could be as effectively and cheaply irrigated as at Orroroo, and the soil is eminently suitable for lucerne. I believe a little to the north of Quorn is a most suitable site for a dam, where an immense quantity of water could be impounded for reticulation by gravitation to the plains below. On the west side, from Hookina to Port Germein, innumerable creeks yield seas of water, which, with the exception of the Port Augusta supply, runs to waste. The Flinders Range, with its splendid rainfall of 18in. to 25in., is full of water which only needs impounding. On the Murray the water at Renmark is pumped to three levels, while from the Flinders Range on both sides the plains below can be watered by gravitation—the cheapest method in the world. If the object lesson at Orroroo proves a success, as I feel sure it will, a progressive Government will not hesitate to extend the idea far and wide, and no one would begrudge the increase of our national debt for such a grand heritage to posterity. What lucerne, or alfalfa, has done for America it will do for Australia, and the 8in. or 9in. rainfall country of our district, on which to-day a precarious existence is eked out, will become the garden of our State. We are a young country, and we have an abundance of cheap land, but the day will come, and at no distant date either, when the plains on both sides of the Flinders Range will be miles of luxuriant lucerne, grazing thousands of dairy cattle, yielding millions of pounds of butter, with a population of prosperous yeomanry growing rich on 50 acres of irrigated land."

The Commissioner of Crown Lands said the thanks of the Conference was due to Mr. Robertson for having brought this matter forward, and he sincerely hoped the advice given would be adopted. He was satisfied that the results achieved at Pekina would justify the construction of the reservoir. The cost of such works had been reduced lately by the introduction of wooden pipes, which of course were infinitely cheaper than cast-iron pipes. At Spring Creek there was a natural place for the catchment of an immense quantity of water, which, if it could be economically sent out on the plains in the direction of Willowie, would add vastly to production in that locality.

The Minister of Agriculture and himself intended to visit Parachilna with the Superintendent of Irrigation (Mr. McIntosh) to ascertain whether water could not be conserved and used on the Parachilna plains. The Government would welcome any information relating to catchment areas, and he promised that as soon as possible attention would be devoted to the thorough investigation of the matter.

PREPARATION OF FALLOW

This subject was also introduced by Mr. W. Robertson in the following paper:—

" It seems to me that Bureau investigation scarcely attains to finality, which, to my mind, is where it lacks efficiency or completeness. We read, for instance, the important subject of fallowing dealt with in many divergent ways by different Branches, and yet no consensus of opinion arises to refute errors and definitely state the true practical and scientific method of the subject. I admit that good results from various methods have been obtained when seasons by their excellence have combated an imperfect system, but even then the results are far below what they would have been under systematic treatment. The Campbell system of dry farming is simply a perfect method of fallowing and subsequent treatment of the land—a treatment that aims at the conservation of the moisture by securing and maintaining a fine tilth through judicious cultivation. In only one particular is there a difference, viz., subpacking; but we strive for and obtain almost the same results in a different way, for we all recognise the necessity for a solid seedbed. I feel sure that no farmer if he studies his land and his pocket should ever crop any but fallow land, for however bad the season may be, he will never have a dead failure or a dirty crop. To my mind there is only one formula. Start fallowing about June 1st, the depth being regulated by the nature of the soil, and reducing the depth towards the completion of the season, keeping the harrows constantly following the plough so as to reduce the surface to a fine tilth, and thereby encouraging the growth of vegetation. About September this vegetation must be destroyed by the scarifier or cultivator, assisted by sheep, but under no circumstances to a greater depth than 2½ in., for the seedbed, which has now become fairly set by the sheep and rain, must not be disturbed. Then use the harrows to create and maintain a fine tilth, for on this solely depends the retention of the moisture in the soil. Once the land is allowed to bake hard on the surface, away goes the moisture and the soil cracks. Farmers as an excuse say they have no time for all this cultivation, but that is because in their ambition to seed a big area they prolong the work till they get late with their fallowing, and so are behind hand all the rest of the season. I maintain that it is wiser to put in 300 acres of fallow than 600 acres of stubble land, for not only do you get your seeding over at the proper time and then get on with next year's fallowing, but however bad the season may turn out, you are not likely to have a complete failure nor a dirty crop. With the great improvements in farming machinery

the work can now not only be better done, but greatly facilitated, and I say emphatically that any farmer who averages less than 16bush. over a 10-year cycle is not only not doing justice to his land, but is ignoring the educational and scientific deductions expounded in our *Journal of Agriculture*."

Mr. J. McColl (Quorn) agreed that in dry districts only fallow land should be sown. In addition to the moisture problem a stubble crop was always weedy. In preparing fallow all weeds should be destroyed before December.

EVENING SESSION.

The Minister of Agriculture continued his remarks made earlier in the day as follows:—"Continuing along the lines of my remarks this morning, I wish to tell you what the Government is doing to find markets for the produce of South Australia. The Produce Export Department is working in the interests of the farmers, and it behoves the producers to market their produce through this Government channel. The department handled last year 300,000 lambs, which were sent to oversea markets. We cannot find honey enough to meet the demands of the Trade Commissioner for the London trade. Some 300 tons of first quality honey could be placed upon the English and Continental markets if only the farmers and apiculturists would produce it. The department makes your cream into butter and finds a market for it. It has gone into the meat-canning industry, and you may test the quality of the products by purchasing some canned tongues from the store-keeper. We also handle your fruit. Last week we showed in Adelaide a quantity of bottled fruits which would prove equal to that produced in any part of the world. We, as a Government, have made arrangements to forward to the Trade Commissioner quantities of fresh, dried, and bottled fruits, and this bottled stuff I refer to with other samples is being sent to London in order to open up a wider market for these South Australian products. As showing the prosperity of the Commonwealth, the following figures are of interest. Australia's export trade for 1910 was £9,178,791 more than that of 1909, in spite of a decrease of nearly £4,000,000 in the export of gold. Imports were valued at £51,171,896 in 1909, while in 1910 they reached £59,456,238. Coming nearer home we find South Australian imports and exports in 1899 were valued at £15,273,254, while in 1909 the amount was £23,982,370, an increase in the total trade of £8,709,116, while the exports alone have increased from £8,388,396 to £12,646,701, or, in other words, South Australia's trade is 57 per cent. greater to-day than it was 11 years ago. The wool exported in 1900 was valued at £1,003,391, and 10 years later it was worth approximately £1,800,000. Satisfactory as these figures are, the position in regard to wheat is still more striking. Wheat and wheat products exported in 1900 were valued at £867,547; in 1909 the export of the same products was £3,651,877. The opening up of vast areas of land,

roughly 3,000,000 acres, which will be settled in the near future, will increase the cereal production to the value of 10 or 15 millions of pounds per annum. The department has established a series of experiments on its farms to find out the best varieties of wheats and other cereals to grow; what manures to use; to find out what system of cultivation is best suited for each district; and to get and give information such as growing of fodder crops, irrigation experiments, dry farming, &c. The interests of the farming community will be looked after and encouraged as far as it is possible for a Government to do it."

LAND SETTLEMENT.

The Commissioner of Crown Lands delivered a vigorous address upon land settlement in South Australia. During the past year, he said, there had been allotted an area of no less than 901,714 acres of land to 769 settlers. Of this land 668,040 acres were under perpetual and miscellaneous leases, and 233,704 acres under agreement, with covenant to purchase. Of the latter figure 23,390 acres were lands repurchased under the Closer Settlement Act. During the next three months about 522,700 acres would be available. This comprised 65,700 acres of repurchased lands (North Boorowie Estate, Struan Estate, and University lands in the Hundred of Tatiara), 291,000 acres in the Hundreds of Hooper, Marmon Jabuk, and Vincent (on Tailem Bend-Brown's Well railway), and Hundred of Pendleton, near Keith. There were 116,000 acres in the Hundreds of Rudall and Moody, on the Cummins and Darke's Peak railway line, and about 50,000 acres in the hundreds of Travers and Wallis, north-east from Venus Bay. There were about 3,500,000 acres of land which would be available for settlement during the next three or four years. These lands would be quite useless without means of transport, and therefore land settlement must go hand in hand with a vigorous policy of railway construction. A large part of the above-mentioned lands had been considered worthless for agriculture a few years ago and of little use for grazing purposes, as it was covered with scrub. Superphosphate and improved methods of cultivation had, however, revolutionised the face of the country in many districts, and land that was once considered almost worthless was now profitably settled. In districts where the rainfall was regular, though light, paying yields of wheat were obtainable in almost every instance, and it was not improbable that land which was now considered too dry for the growth of cereals would in the course of a few years be found suitable for cultivation by the adoption of dry farming methods. In the near future the people would be asked, through the district councils, to consider a measure under which power would be given to councils and trusts to ask for the construction of light lines where the people were ready to guarantee interest on the capital. He believed that would stimulate land settlement. Queensland had led the way with a vigorous railway policy. He believed that it would be possible to put

down a mono-railway at a cost of less than £500 per mile, and saw no reason why every farmer in the neighborhood should not have a private track attached to the nearest main line, and thus convey his produce to the trunk railroad. An experiment with such a railway was being conducted by the Loxton Farming Company, which had laid a track from its property to the River Murray. The Government was observing the undertaking with the closest interest, and he believed it would prove successful. The Government desired to push on with irrigation schemes on the Murray. Areas at Waikerie and Berri had been allotted, and irrigation schemes at these places and at Kingston were in progress. Cobdogla Station would be the next area taken in hand by the Irrigation Department. This comprised practically the whole of the original Lake Bonney irrigation scheme. This lake would have a storage capacity of 22,448 million gallons. The department expected to irrigate about 15,000 acres instead of 10,000 acres proposed under the original scheme. The work of reclaiming swamps of the river was being vigorously proceeded with. The area completed and in hand totalled over 5,000 acres. These lands were thus made capable of great production under intense cultivation. The total area under irrigation in the Murray Valley in South Australia was at present 20,000 acres, and this would be increased by 66,000 acres when the schemes in progress and in contemplation had been completed. An irrigated area at Renmark of 5,000 acres produced about £100,000 worth of fruit annually. He was satisfied that a market would be found for the River Murray produce. There was a growing feeling that better opportunities should be offered to people to get on the soil and achieve success. If the Government was able to give larger advances to settlers the assistance would be appreciated, and he thought he could see a way to do that without any additional risk to the State. The load of the new settler should be made as light as possible during the first two or three years—the period of hardest struggling. That could be accomplished by making the rent merely nominal, and, if the man desired, the Government would undertake by contract to roll down some of the scrub, so that he could put in a crop straight away. Arrangements had already been made to do that, and even more, for the selectors on irrigable lands along the Murray, and he felt sure the results would be satisfactory. By the adoption of the schemes outlined and the encouragement of suitable immigration under judicious conditions, much would be done toward filling up the big spaces that were seen on the map.

FACTORS IN SUCCESSFUL CULTIVATION OF WHEAT.

The Acting Director of Agriculture (Mr. A. E. V. Richardson, M.A., B.Sc.), delivered an address under this title, and having given striking proof of the progress witnessed in South Australia during the last few years, said some persons might be inclined to ask, "Is much further progress possible?" Not only was it possible, he said, but absolutely inevitable, because there was room

for a great increase in the area under cultivation and because there was room for greatly increased efficiency. The first point was a political problem, and was to be settled by a vigorous policy of land settlement and railway development, combined, perhaps, with an enlightened and comprehensive system of immigration. So far as efficiency was concerned, improvement might be expected from three directions—in the development of more efficient machinery, by paying more attention to the seed, and by paying more attention to the soil.

Essential Factors.—The first essential in successful wheat cultivation was proper machinery, and in this respect South Australia had been fortunate in the way agricultural engineers had recognised the need for constant improvement. The second essential was good seed. One of the most valuable improvements in wheat cultivation would come when farmers generally realised the importance of the selection of seed. Good graded seed was bushels better per acre than shrivelled, puny seed. That was one meaning of "selection." Another was choosing the variety of wheat which was best suited to local soil and climatic conditions. That was only another way of saying that agriculture was an experimental art, and one could only work out one's own agricultural salvation by actual experiment. There could be no doubt that wheats that matured remarkably early would be well suited for the drier northern areas. Certainly, during the last few seasons, the late varieties had turned out well; but they could not expect to always have such seasons as those had been. With a return to more normal seasons, when they might expect periods of extreme dryness in spring, it was obvious that they should endeavor to secure varieties which matured quickly and were well on toward maturity before the dry spells set in. Such wheats were Bunyip, Cumberland, Thew, King's Early, Gluyas, and Firbank.

Selection for Improving the Yield.—This was the most important form of selection, because by it it was possible to increase the productivity of any given variety. Researches had conclusively demonstrated that the yield of any given variety of wheat, barley, oats, or maize might be increased from 20 per cent. to 25 per cent. by an intelligent and rational form of selection. A simple and effective manner of accomplishing the object would be as follows, provided the wheat had been fixed and was not a hybrid character:—"Choose a field of well-grown wheat of the variety it is desired to improve by selection. Strap a broadcasting tin across your back, and go through the field, selecting all plants which stand out as superior to their neighbors. Choose sufficient of the best heads of these selected plants to yield on hand-threshing about 10lbs. of clean seed. This should not require much more than a couple of hours' work at the outside. The grain obtained represents the best heads of the elite of that crop. Grade this 10lbs. by passing it through a few hand wheat sieves, and sow in one long strip with the drill. Ten pounds should sow one-fifth of an acre. This will represent your 'stud wheat' plot—10lbs. In 1911 go through this one-fifth acre and select 10lbs. of the

produce of the best plants, and, after grading, sow it in 1912 as your 'stud' plot. Strip the balance of the one-fifth acre, and sow all of it in 1912 for your 'seed' plot, because from this you will have the seed to sow on a larger scale the next season. This 5-acre plot should give you enough seed for 100 to 125 acres, and this will be your 'bulk' plot, where the ordinary f.a.q. wheat will be grown year after year. This is all you want each year—a 'stud' plot of one-fifth acre—10lbs. of seed, a matter of a few hours' work; a 'seed' plot, which will be sown from the balance of the 'stud' plot; a bulk plot which will be sown from the seed plot, and which will form the main crop of the farm. With fair land 10lbs. seed in two generations will sow 100 acres to 125 acres. Observe that each year the wheat must be better than the previous, because each year the 'stud' plot is a selection of the best from the best. By such means the standard of productiveness will be considerably raised, and the tendency to degeneration counteracted."

Cultivation of the Soil.—Continuing, Mr. Richardson said South Australia had a reputation throughout the Commonwealth for the way in which the cultivation of the soil was carried on. There was an old saying that cultivation was the best manure, and a truer had never been propounded. Deep ploughing was the secret of success in an arid district, provided the subsequent work of cultivation was thoroughly carried out. The soil that was deep ploughed was in the best possible condition to store up moisture. For every inch deeper one stirred the soil 200 extra tons of soil particles were broken up, and made available for the work of moisture conservation. The average depth of ploughing in South Australia was not more than 3½ in. to 4 in., but in the arid States of America and the Transvaal farmers ploughed regularly 10 in. to 12 in. deep. The American was a pretty shrewd fellow, and he would not plough so deep unless he gained some advantage from it.

Frequent Working.—Deep ploughing, however, was of little avail unless the soil was worked thoroughly afterward, for one of the greatest needs of a wheat crop was a firm consolidated seedbed, fine, but free from large open air spaces, which induced evaporating, and prevented capillary action. The necessary corollary to deep ploughing was intelligent working. By intelligent working he meant working the soil in such a way as to at all times prevent any evaporation of moisture. That could be done by preventing the formation of a hard crust on the surface—by keeping the soil covered with a loose mulch. The existence of a crust on the surface was an indication that the capillary tubes of the soil, by means of which water rose from the subsoil to the surface, were continuous and unbroken, and, consequently, it was merely a matter of time before all the moisture stored in the subsoil would pass through these tubes and evaporate at the surface. By breaking the continuity of these tubes all evaporation was prevented, and the moisture retained in the soil.

Manuring.—The third essential to successful cultivation was systematic manuring. And in that connection two problems presented themselves: What kind of manure should be used, and how much should be applied per

acre? Regarding the first, plants required for perfect growth 10 chemical substances. Seven of these were usually present in overflowing quantities, while three were usually lacking. In most countries the manurial problem was largely one of nitrogen. In Australia phosphoric acid was the one thing needful, and the question of manuring was a question of how, and at what rate, phosphoric acid should be added to the soil. Super.—a soluble form of phosphatic manure—was the only form likely to achieve any results here. Generally speaking, in the moister districts more super. could be put on than in the drier districts. The reason one must be sparing in a dry district was that excessive manure led to a rank, sappy growth, and an abundance of flag, and when a hot, dry spell came the evaporation of moisture from the leaves was so excessive that the roots were unable to supply sufficient moisture to keep up the demands, and failure was the result.

Disease.—One more factor essential for successful wheat cultivation was the prevention of disease. The most serious diseases affecting wheat were rust, smut, and bunt, and in seasons like last year "takeall." There was no cure for rust. It could be mitigated, however, by sowing rust-resistant varieties of wheat, and those that matured quickly and so helped to escape the rust. Bunt and smut were within the control of every farmer, for experience had conclusively proved that properly pickled wheat was quite free from smut. So far as the pickle was concerned, bluestone, formalin, and fungusine were all reliable. Bluestone, 1lb. to 10galls. of water; formalin, 1lb. to 50galls. of water; and fungusine mixed in accordance with directions. "Takeall" had given considerable trouble this year, and had been widespread right through the State. It, like the other diseases, was a fungus growth (*Ophiobolus graminis*). It thrived on wheat, barley, and natural grasses, but had not been observed on oats; therefore it was advisable to fallow early, keep down grasses and weeds, sow oats, and fallow again. The successful farmer would be the one who combined scientific methods with practical business ability in the work of selection and preparation of his seed, and the cultivation and fertilisation of the soil. Their cry should not be "more land," but "better farming," and when the South Australian farmer sowed the varieties of wheat which were best suited to his district, paid the most careful attention to the preparation and grading of the seed, adopted a rational scheme of selection, and cultivated and manured the soil with skill and insight, South Australia would have gone one step farther in the evolution of her agricultural industry, and the South Australian farmer would reap a richer reward for his toil than had his predecessor.

HORSE-BREEDING.

The Government Veterinary Surgeon provided a practical illustrated dissertation on "Horse-breeding." He said the introduction of motors, trams, and aeroplanes had led to the idea being widely entertained that a horseless age had been entered upon, and that horse-breeding would soon

become a thing of the past. As new country was opened up, however, and closer settlement encouraged the demand for horses for agricultural purposes had grown considerably. At present there was a dearth of good horses. He believed, indeed, that good, sound horses would bring to-day nearly double what they would have been sold for four or five years ago, and in many instances a much greater increase in values had been experienced. It was encouraging to observe that many of the most energetic, far-seeing agriculturists were turning their attention to horse-breeding. The recent display at the Adelaide Show was really most creditable. Some of these breeders knew what they were about, and would follow proper lines. There were many, however, to whom a few practical suggestions might prove useful, and to them he would say, "Breed to suit the market, and breed what will command the highest price in the market; breed the best. In the choice of sire, see to it that there is no flaw in his pedigree. Violent crossing is bad; stick to type. Mate a mare with a stallion most likely to produce a saleable type, *i.e.*, if circumstances necessitate crossing. Stallions and mares should be vigorous, active specimens of their breed. Select full-sized breeding stock. Color should be dark—bays, browns, or blacks. Light colors indicate weakness of constitution, and such horses are undesirable to breed from. Mares that are poor milkers will not pay to breed from, as the foal is usually stunted for want of milk. Breed only from animals free from hereditary unsoundness. Soundness is essential for the preservation of good stock. Choose a breed according to the nature of the country, *i.e.*, if suitable for draughts, bloods, &c., as the case may be. Disabuse your minds that every well-topped horse is a good one." The lecturer referred to the different types, including Clydesdale, Shire, Suffolk Punch, thoroughbred, Hackney, Cleveland Bay, Arab, Shetland, Welsh, Hackney, and Dartmoor ponies, and dealt with conformation, defects, narrow faces, short necks (no neck, no horse), ewe necks, humpy withers, hollow and roach backs, sloping rump, split quarters, narrow breast, weak forelegs, bowed knees, calf knees, pigeon-toed and no-kneed horses, bad pasterns, weak hocks, curly hocks, cow hocks, and bow legs. He also touched upon hereditary unsoundness—ringbone, sidebone, spavin, bog spavin, curb, osteoporosis, and unsound feet. In connection with foaling he explained how to rectify wrong presentations, and emphasized the need for bestowing proper attention upon the mare before and after foaling.

EXHIBITS.

A very attractive and creditable display of local products was arranged in the hall for inspection by the delegates and visitors. This included beautiful peaches, grapes, apples, cucumbers, water melons, tomatoes, French beans, and splendid samples of wheat, both grain and in the straw.

The Conference closed with votes of thanks to the Chairman, members of the Government, and others.

THE WHEAT MARKET.

The tone of the English trade papers for some weeks has indicated the probability of a weaker market, and the lowering of prices that took place in January continued steadily during February. The result has been a fall of 6d. per bushel between harvest-time and the end of February.

With respect to the future, *Beerbohm's Corn Trade List* writes—

It is generally believed that stocks of wheat in the world at the present time, thanks to the two large crops of 1909 and 1910, are larger than for some years past, and in this connection it will no doubt be of some interest to try and get some idea of the consumption of wheat during the past few years. Stocks at the end of July, 1909, were smaller than for many years past, both visible and invisible, the result of the two small crops of 1907 and 1908. Judging from the fact that prices were at a rather low level in the years 1902 to 1906, and for several years prior to 1902, it may be taken for granted that reserves were at least normal, and the crops in those years more than equal to the consumptive requirements. It will be found that the average yearly yield for the seven years 1902 to 1908, amounted to about 410 million quarters. The moderate to fair crops of 1902 to 1906 probably added 10 to 15 million quarters to the world's reserves, but the very short crops of 1907 and 1908 showed a deficiency of 40 to 45 million quarters. Allowing, therefore, 30 million quarters for decreased reserves, visible and invisible, at the end of July, 1909, compared with 1902, we arrive at a total consumption in the seven years of a little over 414 million quarters per year, ranging from 406 million quarters in 1902 to 425 million quarters in 1908. The world's crop of 1909 amounted to 459 million quarters, and the consumption to 429 million quarters, leaving a surplus of about 30 million quarters to form what may be called, in view of the now much larger annual consumption, a full normal reserve. The world's population is roughly estimated to increase 1 per cent. per year, but the increase in the consumption of wheat would be somewhat less than 1 per cent., as the increased population includes non-consumers as well as consumers of wheat, and an increased allowance in consumption of four millions per year seems a reasonable one. The last crop, allowing for the light weight of the Russian and other European crops, works out at about 450 million quarters, and the consumption for 1910-11 at 433 million quarters, leaving a surplus at the end of the present season of about 17 million quarters, over and above a normal stock, apart from any special increase in this year's consumption, as a result of the very small potato crop. It is therefore pretty evident that there are ample supplies in the world at the present time; it is also shown that the consumption of wheat now is on such a large scale that a shortage of only 5 per cent. compared with last year's large crop would reduce the production below the annual requirements, and necessitate drawing on reserves, which, as shown above, are fortunately quite liberal.

The following paragraph from *Broomhall's Corn Trade News* gives some interesting figures showing the relation between European requirements and the supply :—

We have now traversed one-half of the cereal year 1910-11, and it will be interesting to take stock and ascertain if the predictions made at the outset are being borne out by events. In the annual review, published during September-October last, the conclusions arrived at were that "the demand and supply likely to be experienced during the current season would both exceed all previous records." That this prediction is in a fair way of being fulfilled is now evident to all observers who watch the Monday's cables, for the heavy supplies put afloat each week are disappearing from sight in a most remarkable way. Our estimate of the likely requirements of the season was put at 76,600,000 quarters, equal to 38,300,000 quarters for six months, whereas the actual net import of the several countries concerned has been 41,977,000 quarters in the first six months. The magnitude of this quantity can be realised better when we recall the fact that previous to 10 years ago the annual requirements of a twelvemonth were only 50,000,000 quarters; indeed, the imports amounted to only 46,490,000 quarters in the season 1899-00, 48,000,000 quarters in 1898-90, and 46,500,000 quarters in 1896-97.

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Feb. 9	Feb.-March 4 3/4	3/4	3 5/4	3/5 b.
10	Feb.-March 4 3/4	Do.	Do.	3 3/4 to 3/5
11	Firm and quiet	Do.	Do.	—
13	—	Do.	3 5/4 to 3 5/4	3/4 to 3/5 b.
14	Quiet	3/3	3 5/4 to 3 5/4	3/3 to 3 3/4 b.
15	4 5/4	Do.	3/5 ex store	3/3 to 3/5 b.
16	Jan.-Feb. 4 3	3/2 1/2	3 4/4	Do.
17	Jan.-Feb. 4 3/4; Liverpool 4 3	Do.	3 4/4 to 3/5	3/4 b.
18	Jan.-Feb. 4 3	Do.	3 4/4	—
20	—	Do.	3 4/4 to 3/5	3 3/4 to 3 4/4 b.
21	Dull, with easier tendency	Do.	3 4/4 ex store	Do.
22	Do.	Do.	3 4/4 to 3 4/4	3 3/4 b.
23	Dull and neglected	Do.	3/4 to 3 4/4	3 3/4 to 3 3/4 b.
24	4 5/4	3 2	3 4/4 to 3/5	3 3/4 b.
25	Feb.-March 4 2 1/2	Do.	3 4	—
27	—	Do.	Do.	3 2 1/2 to 3 3 b.
28	No demand	Do.	3 2 1/2 to 3 3 1/2	—
March 1	Do.	3 1 1/2	3 3 1/2 to 3 4	3 2 1/2 to 3 3 1/2
2	Dull, with easier tendency	3 1	3 3 to 3 3 1/2	Do.
3	Do.	Do.	3 3 1/2	3 2 to 3 2 1/2
4	Off coast 4 2. Feb.-March. 4 1 1/2	Do.	3 3	—
6	—	Do.	3 3 to 3 3 1/2	3/2 to 3/2 1/2
7	Dull and neglected	Do.	3 3 to 3 3 1/2	3 2

STEAMER FREIGHTS.—The freight market is firm. Tramp steamers from Australia to United Kingdom-Continent are holding for 26s. 3d. per ton (8 1/2d. per bush.). Parcels Port Adelaide to London or Liverpool, 25s. per ton (8 1/2d. per bush.); Continental ports. 26s. 3d. per ton (8 1/2d. per bush.). Port Adelaide to Melbourne, 8s. per ton (2 1/2d. per bush.). to Sydney, 10s. 6d. per ton (3 1/2d. per bush.).

SAILER FREIGHTS.—To United Kingdom-Continent, asking 25s. 3d. per ton (8 1/2d. per bush.), according to size and position.

RAINFALL TABLE.

The following table shows the rainfall for February, 1911, at the undermentioned stations, also the average total rainfall for the first two months in the year, and the total for the two months of 1911 and 1910 respectively :—

Station.	For Feb., 1911.	A'v'ge. to end Feb.	To end Feb., 1911.	To end Feb., 1910.	Station.	For Feb., 1911.	A'v'ge. to end Feb.	To end Feb., 1911.	To end Feb., 1910.
Adelaide	1.30	0.60	1.47	0.08	Hamley Bridge	1.92	0.49	2.12	0.35
Hawker	0.16	0.54	0.32	0.53	Kapunda....	2.35	0.61	2.58	0.70
Cradock	0.09	0.68	0.77	1.36	Freeling	2.76	0.47	2.86	0.47
Wilson.....	0.15	0.60	0.23	2.03	Stockwell ...	2.78	0.50	3.03	0.73
Gordon	—	0.61	1.07	0.80	Nuriootpa ...	1.73	0.54	2.00	0.49
Quorn	0.10	0.48	0.42	0.67	Angaston ...	2.76	0.48	3.01	1.08
Port Augusta	0.57	0.47	0.84	0.81	Tanunda.....	2.75	0.57	3.31	0.58
Port Germein	1.92	0.36	2.23	0.34	Lyndoch ...	1.33	0.52	1.40	0.62
Port Pirie ...	2.28	0.35	2.46	0.37	Mallala	1.47	0.44	1.57	0.11
Crystal Brook	2.09	0.52	2.11	1.24	Roseworthy ...	1.75	0.45	1.77	2.20
Pt. Broughton	1.56	0.45	3.21	0.28	Gawler.....	1.59	0.63	1.64	0.85
Rute	1.96	0.33	2.18	0.60	Smithfield ..	1.51	0.55	1.58	0.15
Hammond ...	0.30	0.52	0.30	1.50	Two Wells...	1.47	0.41	1.50	0.03
Bruce	0.31	0.66	0.63	1.09	Virginia.....	1.22	0.45	1.28	—
Wilmington .	0.77	0.50	3.59	0.80	Salisbury....	1.94	0.54	1.97	0.54
Melrose	1.34	0.83	3.90	0.88	Teatree Gully	1.52	0.78	1.64	0.14
Booleroo Cntr	0.75	0.55	0.77	1.25	Magill	1.96	0.58	2.34	0.13
Wirrabara...	1.58	0.59	1.00	0.65	Mitcham ...	2.46	0.42	2.61	0.05
Appila	1.30	0.62	1.41	2.45	Crafrers.....	3.79	0.82	4.43	0.35
Laura	1.87	0.61	1.97	2.10	Clarendon ...	3.24	0.69	3.57	0.07
Caltowie	1.59	0.63	1.59	1.62	Morphett Vale	2.71	0.46	2.90	0.05
Jamestown...	1.78	0.62	1.87	0.58	Noarlunga ...	3.35	0.46	3.39	0.08
Gladstone ...	1.55	0.55	2.57	0.78	Willunga ...	3.51	0.60	3.54	0.09
Georgetown .	2.26	0.66	2.31	0.55	Aldinga	1.98	0.33	2.17	0.05
Narridy	2.07	0.59	2.09	0.46	Normanville..	2.73	0.50	2.75	—
Redhill	1.89	0.60	1.91	0.04	Yankalilla...	2.68	0.31	2.73	—
Koolunga ...	1.65	0.71	1.68	0.17	Eudunda....	2.09	0.50	2.50	2.53
Carrieton ...	0.24	0.51	0.27	4.50	Sutherlands ..	1.12	—	1.27	0.97
Eurelia	0.99	0.48	0.99	2.81	Truro.....	2.47	0.51	2.70	0.36
Johnsburg ..	0.70	0.42	0.70	2.49	Palmer	2.16	—	2.50	0.34
Orroroo	0.42	0.58	0.42	2.30	Mt. Pleasant.	2.30	0.65	2.54	0.33
Black Rock...	0.62	0.54	0.62	2.66	Blumberg ...	2.15	0.57	2.48	0.74
Petersburg ..	0.91	0.51	0.95	1.64	Gumeracha...	2.02	0.68	2.38	0.97
Yongala	1.09	0.56	1.11	1.50	Lobethal....	2.02	0.71	2.36	0.39
Terowie	1.47	0.69	1.81	5.58	Woodside ...	2.44	0.75	2.68	0.44
Yarcowie ...	1.34	0.58	1.68	4.62	Hahndorf ...	3.52	0.62	3.90	0.64
Hallett	1.50	0.57	1.96	1.35	Nairne.....	4.16	0.76	4.67	0.22
Mount Bryan	1.40	0.93	2.07	2.04	Mt. Barker ...	3.06	0.85	3.58	0.92
Burra	1.58	0.64	2.51	2.33	Echunga ...	2.94	0.64	3.34	0.18
Snowtown...	1.39	0.44	1.45	0.11	Macclesfield .	2.83	0.58	3.39	0.32
Brinkworth...	1.51	0.70	1.57	0.13	Meadows	3.97	0.63	4.24	0.38
Blyth.....	1.73	0.55	1.73	0.11	Strathalbyn .	2.62	0.62	2.78	0.27
Clare	2.31	0.77	2.49	0.21	Callington ...	1.79	0.51	2.22	0.08
Mintaro Cntrl	2.61	0.69	3.16	0.11	Langh'rne's B	1.30	0.46	1.51	0.22
Watervale...	3.53	0.64	3.79	0.32	Milang	1.18	0.52	1.31	0.12
Auburn	2.57	0.78	2.80	0.71	Wallaroo ...	1.79	0.37	1.83	0.13
Manoora	1.77	0.50	1.88	1.26	Kadina	1.92	0.34	1.95	0.12
Hoyleton....	2.83	0.45	2.93	—	Moonta	1.54	0.37	2.34	0.12
Balaklava...	3.15	0.42	3.17	0.03	Green's Pns. .	1.96	0.28	2.00	—
Pt. Wakefield	5.18	0.47	5.56	0.26	Maitland....	2.59	0.43	3.45	—
Saddleworth.	1.45	0.68	1.60	1.17	Ardrossan ...	1.66	0.35	1.92	—
Marrabel....	1.17	0.48	1.35	0.11	Pt. Victoria..	1.83	0.32	2.42	0.01
Riverton....	2.04	0.56	2.33	0.93	Curramulka .	2.55	0.28	2.56	0.01
Tarlee	1.44	0.51	1.53	0.81	Minlaton....	2.14	0.33	2.14	—
Stockport ...	1.59	0.42	1.76	0.21	Stansbury ..	1.90	0.32	2.02	0.02

RAINFALL TABLE—continued.

Station.	For Feb., 1911.	Av'ge. to end Feb.	To end Feb., 1911.	To end Feb., 1910.	Station.	For Feb., 1911.	Av'ge. to end Feb.	To end Feb., 1911.	To end Feb., 1910.
Warooka....	3.81	0.36	3.91	0.08	Bordertown .	2.43	0.41	2.61	0.16
Yorke town .	2.89	0.30	2.91	0.12	Wolseley....	2.45	0.32	2.60	0.16
Edithburgh..	2.06	0.41	2.06	0.79	Frances.....	2.03	0.30	3.05	0.34
Fowler's Bay.	0.83	0.37	1.04	0.05	Naracoorte .	2.42	0.59	2.90	0.25
Streaky Bay.	1.42	0.47	1.42	—	Lucindale ...	3.11	0.48	3.10	0.49
Pt. Elliston..	1.64	0.49	1.64	0.08	Penola.....	3.76	0.73	4.39	1.01
Pt. Lincoln..	1.55	0.50	1.60	0.05	Millicent	4.58	0.77	4.58	0.82
Cowell	0.87	0.46	1.10	0.18	Mt. Gambier.	4.50	0.95	4.70	1.44
Queenscliffe .	—	0.37	—	0.25	Wellington ..	2.50	0.40	2.96	0.02
Pt. Elliot....	1.70	0.65	1.77	0.17	Murray Bridge	2.00	0.40	2.17	0.07
Goolwa	2.51	0.56	2.73	0.13	Mannum ...	1.30	0.38	1.44	0.33
Meninnie....	1.58	0.52	1.99	0.15	Morgan	2.23	0.40	2.29	0.78
Kingston....	3.35	0.54	3.35	0.07	Overland Crnr	2.33	0.58	3.34	0.55
Robe	4.18	0.60	4.18	0.18	Renmark ...	2.82	0.61	3.59	0.65
Beachport....	4.44	0.70	4.44	0.56	Lameroo ...	—	—	0.83	0.08
Coonalpyn ..	1.79	0.39	2.03	0.27					

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on March 1st :—

BUTTER.

Considering the period of the year, the supply of cream has been very good, and as the quality of the butter has been well maintained, a large and increasing demand has been the result. The present prices are—Superfine, 1s. 0½d.; pure creamery, 11½d.

Messrs. A. W. Sandford & Co. report on March 1st :

POTATOES.—New locals, £5 to £5 10s. Adelaide; Gambiers, £4 15s., on trucks Adelaide or Port, per ton of 2,240lbs.

ONIONS.—New locals, £4 to £5 Adelaide; Gambiers, £4 to £5, on trucks, Adelaide or Port, per ton of 2,240lbs.

BUTTER.—Best factory and creamery, fresh in prints, 11d. to 1s. 0½d.; second grade factories, 8½d. to 9½d.; choice separators, dairies, 10d. to 11d.; medium quality, 7½d. to 8d.; well-conditioned stores and collectors', 7d. to 8d.; heated lots down to 6½d.

CHEESE.—Factory makes, new season's, for large to loaf, 4½d. to 5½d. per lb.

BACON.—Factory-cured sides, 7d. to 7½d.; middles, 8d. to 9d. per lb.

HAMS.—In calico, 9d. to 9½d. per lb.

EGGS.—New-laid hen, 11½d. per dozen.

LARD.—Skine, 6½d.; tins or bulk cases, 6½d. per lb.

HONEY.—Prime clear extracted, new season's, 2½d. per lb.

ALMONDS.—Soft shells, Brandis, 6½d.; mixed soft shells, 6d.; kernels, 1s. 2d. per lb.

LIVE POULTRY.—Good table roosters, 2s. 9d. to 3s. 3d. each; plump cockerels, 1s. 9d. to 2s. 6d.; hens and light cockerels, 1s. 6d. to 2s.; ducks, 2s. to 3s.; geese, 3s. 6d. to 4s. 6d.; pigeons, 7½d.; turkeys, 10d. to 11½d. per lb., live weight, for fair to good table birds.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		March.	April.			March.	April.
Amyton	*	—	—	Meningie	†	11	15
Angaston	805	11	8	Merghiny	*	2	6
Appila-Yarrowie	†	—	—	Millicent	*	14	11
Arden Vale & Wyacca	*	—	—	Miltalie	—	11	8
Artherton	*	—	—	Minlaton	*	18	15
Balaklava	805	—	—	Mitchell	*	11	15
Beetaloo Valley	*	—	—	Monteith	814	11	—
Belalie North	†	11	8	Moonta	810	—	—
Blyth	*	21	18	Morchard	*	—	—
Bowhill	*	—	—	Morgan	814	11	8
Bowmans	*	9	13	Morphett Vale	*	—	—
Brinkworth	*	18	15	Mount Bryan	†	11	8
Bute	*	—	—	Mount Bryan East	*	4	1
Butler	*	—	—	Mount Gambier	821	11	—
Caltowie	*	11	8	Mount Pleasant	819	10	14
Carrieton	—	9	13	Mount Remarkable	*	9	13
Cherry Gardens	816	14	11	Mundoora	*	—	—
Clare	806	10	14	Murray Bridge	*	—	—
Clarendon	*	13	10	Nantawarra	†	8	12
Colton	811	11	8	Naracoorte	823-4	11	8
Coomooroo	801	13	10	Narridy	*	—	—
Coomalpyne	*	—	—	Northfield	808	14	11
Craddock	802	—	—	Orroroo	*	—	—
Crystal Brook	*	—	—	Parrakie	815	4	1
Cummins	*	11	8	Paskeville	†	11	8
Davenport	†	—	—	Penola	824	4	1
Dawson	*	—	—	Penong	—	11	8
Dingabledinga	*	10	14	Petina	*	—	—
Dowlingville	*	—	—	Pine Forest	*	14	11
Elbow Hill	811	11	—	Port Broughton	*	10	14
Forest Range	817	9	13	Port Elliot	820	18	15
Forster	*	—	—	Port Germein	—	—	—
Frances	821	10	7	Port Pirie	803	—	1
Freeling	*	—	—	Quorn	*	—	—
Gawler River	*	—	—	Redhill	*	14	11
Georgetown	*	11	15	Renmark	815	—	—
Geranium	*	25	29	Saddleworth	*	17	15
Green Patch	*	13	10	Salisbury	†	7	4
Gumeracha	*	13	10	Shannon	812	—	—
Hartley	818	11	8	Sherlock	816	—	—
Hawker	*	13	17	Stockport	808	—	—
Hookina	—	11	25	Strathalbyn	*	20	17
Johnsburg	*	—	—	Sutherlands	816	—	—
Kadina	809	9	15	Tatiana	—	—	—
Kalangadoo	—	11	8	Uraidla and Summert'n	821	6	3
Kanmantoo	†	10	8	Utera Plains	813	11	8
Keith	*	—	—	Waikerie	*	—	—
Kingscote	—	7	4	Watervale	808	—	—
Kingston	*	25	29	Wepowie	*	—	—
Koppio	811	—	—	Whyte-Yarcowie	805	—	—
Kybybolite	*	9	13	Willowie	*	—	—
Lameroo	813	—	—	Willunga	*	4	1
Lipson	*	—	—	Wilkawatt	*	—	—
Longwood	819	8	12	Wilmington	802	8	12
Lucindale	*	18	—	Wirrabara	803	11	—
Lyndoch	*	9	—	Woodside	*	—	—
Maitland	*	4	1	Yadnarie	*	—	—
Mallala	*	6	3	Yallunda	*	—	—
Mannum	*	25	29	Yongala Vale	*	11	8
Meadows	*	13	—	Yorkstown	†	11	8

* No report received during the month of February.

† Only formal business transacted at the last meeting.

NOTE.—It has been necessary owing to demand on space to hold over a number of reports till the April issue.

REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Coomooroo, February 1.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Brown (chair), H. and L. Avery, Brice, Robertson, Toholke, and Kildea (Hon. Sec.).

CARE OF HARNESS.—The following paper on this subject was read by the Hon. Secretary:—
 “Harness is an expensive item, and calls for careful treatment. Saddles thrown on their backs, or left in the hot sun or in the rain will not last long; whereas, if they are carefully hung up—secure from the weather—they will last for many years. They need to be dressed with some preparation from time to time. This piece of harness is only one instance of all the leatherware in use on the farm. Collars, winkers, traces, cart-saddles, breechings, &c., are usually knocked out—not worn out. It would be well for the farmer to thoroughly overhaul his harness two or three times a year, and have any rips or breakages attended to at once, either by himself or a saddler. It is also a good plan to make a note of anything which will soon need to be replaced. All harness should be treated to a good dressing of some kind after having been washed with soft soap and warm water. For harness which is much exposed to the sun and dust I think neatsfoot oil is the proper preservative. For buggy harness and saddles there are many good preparations. One can make a good dressing as follows:—Mix of mutton fat about half, neatsfoot oil a quarter, and resin a quarter. Resin as a leather preservative is not appreciated as it should be. Apart from making the leather tough and durable, resin is a wonderful preservative of the stitching, whereas neatsfoot oil alone and many dressings rot the stitching. The above mixture should be applied hot, and for tan harness one might add some red dye to give it a nice bright color.” In the discussion which followed, Mr. Brice said he always rubbed caul fat into the harness, and let the sun dry it. Mr. Avery used mutton fat and resin as a dressing for farm harness. He thought the addition of neatsfoot oil would be an improvement. Mr. J. Brown agreed that neatsfoot oil, resin, and fat was a good mixture. It was generally conceded that resin was a preservative of the stitching.

CARE OF IMPLEMENTS.—Mr. M. Robertson read an extract from December *Journal* on this subject. All agreed that implements should have a place properly sheltered from the influences of the weather, and that the sheds should face south-east or south in this part of the country.

BREAKING CARRIAGE HORSES.—A paper on this subject was also read by the Hon. Secretary. It ran as follows:—“First of all I would drive the colt into a strong yard by itself. The fences should be too high for any attempts at jumping, and the yard should be a rectangular oblong, as this gives a better chance to get near the colt than in a square yard. Let the animal run round until it finds itself securely hemmed in. This will prevent it from dashing from one end of the yard to the other. Then go into the yard and just follow the colt about quietly for some time. Then procure a flexible stick 3ft. or 4ft. long, and when you get near enough just stroke the colt with the stick along the withers, the back, and rump or down the shoulder, if that is easier to reach. If the animal moves around the yard try to keep the stick on its back all the time. After a while you should be able to put your hand on the horse, and gradually pat and rub all over its body. If not of a wild nature the colt soon becomes very quiet and tame. This should be enough for one day. When yarded next day you will rapidly arrive at the same stage of intimacy with the horse. Put on the winkers or open bridle—as preferred—after having secured the horse by a good rope. If it is difficult to get the bridle on run the colt around the yard with a half-hitch over the nose. Leave the bridle on for some time that day with a pair of reins tied back to a surcingle, and drive the animal around the yard, with the whip if necessary. The next day put on the bridle or winkers and a rope through the bit rings. Take the horse out of the yard and lead and drive

it about for some time, until it seems to be fairly in hand. Then put on a pair of leather reins and drive it about until you are satisfied it will answer to them. Let the reins flap about its sides and down over the tail. Also let it back into the reins on either side sometimes; this will get it used to traces. Flick lightly with a whip if it does not want to go. Now put it into a trap with a quiet horse. If a small animal, strap the hame rings to a surcingle to prevent it from forming the habit of turning around in harness." In discussing this paper Mr. Brice preferred a crush-pen for catching young horses. It was a quick method, and prevented a horse from becoming cunning. Mr. Brown considered mousing an important matter, and that a horse should have a bit in its mouth for a couple of days while turned out into the fields. Mr. A. Toholke liked the whip method. He could in this way secure a colt in a field. Mr. Avery pointed out that in a yard with other horses it was not always possible to catch it with a whip, and Mr. Brown said that horses became very tricky, and sometimes stood in a corner with their hindquarters towards the owner, and would not turn round.

Cradock, February 4.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. Patterson (chair), Lindo, Adams, Smythe, Harris, Finch, Solly, McAuley (Hon. Sec.), and one visitor.

TAILING LAMBS.—This subject was introduced by Mr. Solly, who said—"Last season I had several sheep flyblown, and it was found necessary to use Cooper's dip as a preventive. On this season's lambs I have left about 4 in. of tail. I find that the lambs do not suffer nearly so much if sufficient tail is left to brush the droppings clear of the breech. Again, the exposure caused by removing too much tail is responsible for injuries such as fly stings, which seriously interfere with the natural functions of the sheep, and it also assists the blowfly in its work. When sheep are disturbed and worried they trample and cut up the feed, and lose condition. It is unwise to tail and sear fat lambs in the spring, as at that time a large percentage may be lost. Ewe lambs require considerable care when blowflies are about."

Wilmington, February 8.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Payne (chair), Robertson, Jacobs, Slee, D. and S. George, J. and W. Schuppan, Scholefield, Iitchfield, Robertson, Hill, Hannagan, and Jericho (Hon. Sec.)

FERTILISERS.—The following paper was read by the Hon. Secretary:—"Wheat land that is under continuous cultivation, even if crop rotation is practised, naturally yields larger returns when the right kind of fertilisers are properly used. Local conditions of weather and soil should be studied; and to obtain the best results each farmer must learn by experience whether certain manures are profitable for certain land. The yield does not increase in proportion to the amount of plant food applied, although in many cases the growth of straw is increased by heavy applications. In general farming, barnyard manure has the greatest relative value. The soils of China have been in continuous cultivation for 4,000 years without falling off in productiveness, and this is due to the continued utilisation of all animal manures. The Indian soils have been cultivated for over 2,000 years without artificial fertilisers, and they still yield fair returns. Egyptian lands have been cultivated since history began, and are to-day as fertile as ever. This is the result of the use of all animal manures. The estimated loss to farmers of the United States by letting go to waste barnyard manure is £3,000,000 annually. Both fresh and rotted manures enrich the soil with nitrogen, phosphoric acid, and potash. They make it warmer and enable it to retain more moisture. Rotted manure, however, acts more promptly. Manure of this kind is noticeable, more or less, for three years after application, which is not the case with some artificial fertilisers. In these days of keen competition farmers should do all they can to obtain best results as cheaply as possible. Of course, making use of farmyard manures entails extra work, but the balance weighs in favor of this when we consider that thereby the soil is enriched. Barnyard manure should be kept moist and compact. It is when so kept that the best results are obtainable. The quantity to apply per acre depends on the condition and quality of the soil. Anything between 3 tons and 8 tons may be used. Artificial fertilisers contain more plant food than barnyard manures, and fertilisers return larger yields when applied to the seed directly; but, although it is by leaps and bounds displacing barnyard manures, its stability as manure

is questionable. Everything taken into consideration it will be seen that farmyard manure is too valuable to let go to waste. But the farmers' position to-day is to get the most from the land with a minimum of labor."

Wirrabara, February 4.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. E. J. Stevens (chair), Hendrick, Pitman, Thistleton, W. H. Stevens, Woodlands, Hoskins, Hollett, Marner, Bowman, P. and H. Lawson, (Hon. Sec.) and two visitors.

PROGRESSIVE FARMING.—Mr. P. Lawson read a short paper in which he emphasized the need of keeping up to date in all departments of farm work. It was a great mistake, he said, to keep an inferior machine if a better could be obtained. Only the very best class of stock should be kept on the farm, and although a farmer might be doing very well by certain methods of cultivation he should always be prepared to effect an improvement if it was possible. He knew one farmer who flattered himself that it would be impossible to get better sheep than those he had. Having been ultimately persuaded to try a change, he found the fresh stock returned him a profit of one-third more than the same number of the old stock. Another acquaintance bewailed the loss of some cows, which he said could never be replaced. But two of the fresh stock yielded as much profit as three of those he had previously considered unsurpassable. It often paid to lay out money in better stock or plant, and the higher returns soon made up the amount. In discussing the paper Mr. Stevens said farmers should exercise some discretion in purchasing newly-invented implements and machines, as it often happened that new ideas needed a lot of perfecting, and the first machines turned out were not much good.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Port Pirie, February 4.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. Munday (chair), Johns, Birks, Teague, Greig, Hector, McEwin, Hawkins, and Wright (Hon. Sec.).

INCREASED PROFITS FROM FARMS.—A paper on this subject was read by the Chairman. Farmers were always ready to extend operations with a view to increasing the return from their holdings, he said, but by attention to detail the income could be increased without the outlay of large sums of money. The paper then continued much as follows :—
 "Greater care should be taken to prevent waste of every description. More care should also be taken in the preparation of the soil and to eradicate the weeds of various descriptions. Attention should be given to the selection and preparation of the seed by grading out all small and worthless grains as well as seeds of weeds and foreign matter. It must be obvious that it would be folly, after spending a vast amount of time and labor in preparing the soil to sow all kinds of weeds in it. I feel assured that the profits may be largely increased by each one experimenting with a view of finding out the varieties of wheat most suitable to each particular soil and locality. This may entail a little time and labor, but the time spent in so doing will be amply repaid. It is advisable to see that implements and machinery are kept in proper repair, thus avoiding loss of time when time means money. More attention should be paid to the feeding and housing of stock; especially does this apply to the working stock on the farm. It should be the aim of every farmer to keep his horses in the best possible condition, thus enabling him to extract the maximum amount of labor from them when necessary. Provide ample fodder for all kinds of stock and ensure that stock do not exist in a state of semi-starvation. The farmer who has his stock in the pink of condition is enabled to market it to the best advantage. Any farmer who desires his income increased should make his haystacks secure against rain, storms, mice, and fires. The weather may be guarded against by the immediate thatching after erection, and mice may be prevented from doing much damage by placing galvanized

iron round the stack. Loss by fire should be fully covered by insurance in some reliable company. An example of the ravages of mice has come within my own experience during the past year. A portion of a small stack of oatsen hay left over from last year, unprotected by iron, was completely riddled by mice, rendering it almost useless, whereas by a small expenditure in iron much of the loss would have been avoided. Much loss in getting in the harvest may be avoided by providing sufficient horses and machinery to cope with the crop. It is false economy to ask two harvesters to do the work of three or four machines. Grain should be thoroughly cleaned before marketing. It must be obvious that grain properly cleaned before marketing must return eventually a larger monetary return to the grower, in spite of many opinions to the contrary. Farmers generally have to employ a number of hands, and much of the success or otherwise of the year's operations will depend upon the relations existing between master and man. I sometimes think much of the trouble experienced could be avoided if farmers more generally tried to cultivate a spirit of comradeship between themselves and their employés, showing them they had their welfare at heart; not looking upon them as mere machines to be cast aside when no further use, but to be treated in a more humane way; striving to make life more pleasant to them by providing more comfortable quarters than they sometimes have on farms. Especially does this apply to the large employer of labor, who keeps a number of hands permanently. Erecting suitable cottages upon the farm would admit of more married men being kept than is the case at present. Allowing a few small privileges, such as the run of a cow or two, as well as a pig and a few fowls, would help matters; and I feel assured any little outlay incurred in this direction would be amply repaid by the added interest and zest shown in the farmer's behalf by the employé." In the discussion which followed Mr. Hawkins agreed that farmers should take more care of what they produced. It would pay to have more harvesters to expedite the work if sufficient men could be obtained. More farmers were hampered in harvest operations by lack of horseflesh than by want of machinery. It was necessary to keep the fallow clean and well worked. It was of great importance to sow only the best of seed. Mr. Johns said it was difficult to know how to deal with fallow in sandy country owing to the drifting of the soil. He thought that about 500 acres would be a fair estimate to reap with three harvesters in one season. Horses, however, as well as machines, had to be considered, and on sandy country it would require more strength to do the work. The placing of iron around the haystacks to prevent mice and other vermin from gaining access to the stacks, if effective, would more than compensate for the trouble and expense of erecting. With reference to farm labor, he considered that the conditions for the men were now much improved, and as a rule the men were treated exceptionally well; although isolated cases might be found where this was not the case. Messrs. Teague and McEwin agreed that better conditions for the farm working man now prevailed. Mr. Birks said that a visit to Mr. Munday's farm would quickly convince one that he carried out in practice what he had advocated in his paper. Mr. Birks advocated employing married men on the farm and giving them an interest by working on the share system. He had adopted this plan last year with success. The men, having a personal interest, worked much better, and the relations existing between employer and employé were of a very harmonious character. Mr. Greig emphasized the importance of thoroughly preparing the soil for the crop. A large amount of fallow in the district was allowed to become very dirty with weeds, and in many cases it was almost impossible to know whether some paddocks had been ploughed. He considered it was impossible to grow any weeds on the fallows which would not take from the soil some constituent necessary for the wheat plant. Grazing had been a paying business, and it would be more profitable to cultivate a smaller area of land and to work it better than a large area indifferently cultivated. His experience in regard to farm labor was that it was a difficult matter to keep good men for any length of time, as they naturally soon left to make homes for themselves. Married men would be likely to take more interest in the work. Mr. Munday, in replying, said that galvanized iron around the haystacks should be erected immediately after the foundation of the stack was laid. It should be sunk into the ground to a depth of from 6 in. to 8 in. In regard to carting mice into the stack with the hay, the trouble would be minimised to a great extent by placing poison around inside the iron. Slanting boards placed against the iron from the inside allowed the mice to run up and over. He did not expect and would not ask farm hands to do work now as hard as they did 20 years ago. It would not pay to erect cottages for working men on farms where the work was of an intermittent character. [CORRECTION.—Through an inadvertence it was stated in our last issue that the true takeall fungus would not be found on barley, spear grass, and barley grass. As a matter of fact the takeall fungus has been found on all of these plants in addition to wheat.—ED.]

Whyte-Yarcowie, February 4.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lock (chair), M. and J. Walsh, A. J. and G. Mudge, F. and A. Mitchell, Ward, McCann, McLeod, Hunt, Pascoe, E. M. and G. F. Jenkins (Hon. Sec.), and two visitors.

HARVEST RETURNS.—Members reported good results from the harvest. One had reaped a splendid yield from Bearded Gluyas, and also from Pratt's 'Comeback. Federation and Yandilla King had yielded well with all members present, but Dart's Imperial had not done so well as usual. Early fallow gave the best returns. Where the land had been fallowed late and dry, the yield had been considerably diminished by takeall.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, February 11.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Wishart (chair), Friend, Player, Sibley, Ball, Smith, Swann, Thorne, Giles, Salter, Heggie, Matthews (Hon. Sec.), and four visitors.

VISIT TO ROSEWORTHY COLLEGE.—Members spoke in the highest terms of their recent visit to Roseworthy Agricultural College. They considered other Branches would see more and find their visit far more worth while if they would arrange with the Principal for a similar inspection than could ever be the case on the annual farmer's day, when there were so many to show over the farm.

ODDS AND ENDS FOR ORCHARDISTS.—In reply to a number of questions drawn from the question box, the following information was elicited:—Members had used arsenate of lead and Bordeaux mixture together as a spray with good results. Red oil, if painted on the trees when they were dormant, was a good preventive of woolly aphis; and Swift's scalycide was good as a spray. Wire-netting trays for drying currants were not such a success as the wooden ones in this rather late district. Lucerne was far preferable to maize to grow for fodder in this district. Bordeaux mixture had been found to act as a preventive of oidium if used early in the season.

Balaklava, February 11.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Goldney (chair), Wurfel, Heard, Lally, Thomas, Roediger, Baker, Neville, Tuck, and Banyer (Hon. Sec.).

WHEAT DISEASES.—Mr. Neville said he had been growing wheat for about 40 years, but the last season had completely knocked out his theories in regard to fallowing and takeall. His best-worked fallow, fallowed in June, cultivated three times and harrowed two or three times, was the most affected by takeall. One of his paddocks, left till early in September before being ploughed, and then left until after harvest and harrowed after the March rains and sown in June, was the best crop on the farm, returning about 24bush. per acre. It was King's Red wheat. His wheat was very light. Some crops, which looked good enough for 40bush., only went 16bush. or 17bush. per acre. Mr. Thomas fallowed some land in June or July, harrowed twice, and left it until seeding time, and it was the best crop he had. It was Federation, and returned 24bush. The fallow which he had worked most yielded only 13bush. He thought perhaps they had worked their land too much. Mr. Tuck said his best-worked fallow grew a good crop, the heaviest he had ever had in straw, but there was a lot of rust in it. Some of his crop returned 24bush. per acre, and some 18bush. The only sign of takeall was where he did not plough until after March rains—in the sandhills. His conclusion was, therefore, that if they worked their land well they were not so liable to takeall, although Mr. Thomas's experience was similar to that of others whom he knew. His neighbor worked his fallow well, and had a very good crop. He thought there was something in getting the soil well packed down at the bottom. Mr. Roediger did not think land could be worked too much. He

wished he could work his better, but he had too much water about. He had found that where the soil was loose there was most takeall; the land that was not set showed the disease most. He thought that in dry seasons they would find that the best worked land would give the best crops. Mr. Baker had an experience similar to that of Mr. Neville. He worked his land well, and yet had takeall. His theories were, therefore, knocked out. His best crop was on stubble land, which carried oats last year. The takeall of about 25 years ago was different from that experienced last season. He thought there should be a vegetable pathologist, like Mr. McAlpine, of Victoria, at the Agricultural College. Mr. Lally believed in well-worked fallow: He worked his well last year, and had a very good crop considering the season. The average was 20 bush. per acre. He thought if the fallow was always worked well they would come out on top nine times out of 10. Oats killed takeall. His Federation, which promised a tremendous crop, only yielded 14 bush, and that was his worst crop. Takeall appeared on ground worked when dry, and also that worked when wet. He thought rust had more to do with the light yield than was generally considered. There were some very heavy frosts, which were not noticed particularly. If they were now growing the class of wheat they did 20 or 30 years ago they would have been worse off than they were. The Chairman's experience was something like Mr. Tuck's. The early and well-worked fallow was the best. They had not much takeall. They had a quantity of stubble land which was simply drilled in after the March rains. Some of the crops gave 14 bush. The proper season's rain fell in the beginning of May. Some of the crops sown before that suffered from takeall, but that sown after was clean. They worked their land after March rains. He believed in working land at any time to kill weeds. The grain weighed light. They had rust in their Federation. King's Early did particularly well. Some of his neighbors' crops were badly affected by takeall. Mr. Neville explained that he did not wish it to be understood that he did not favor working fallow well, but the past season had not been favorable to it with him. His best paddock was one that had been just scarified before the March rains. He believed the man who fallowed early and worked his land well would do best in the long run.

[Clare, January 13.

(Average annual rainfall, 24in.)

PRESENT. —Messrs. McKenzie (chair), C. J. and I. Radford, Menzie, Berridge, Jarman, Pink, Maynard, Nolan, Lee, Keane, Mayor, Victorson, J. H. and P. H. Knappstein (Hon. Sec.).

PREPARING FRUIT FOR MARKET.—The following paper on "Grading and Packing of Fruit" was read by Mr. Maynard:—"Intensive cultivation has in many places been carried to a high degree of excellence, and Australian horticulturists pride themselves justly on their skill as producers. Admirable and necessary as the highest cultivation must always be, yet something more is required to ensure complete commercial success, namely, the conveyance of the produce in the best possible style to the market or consumer. I think that it is at this point that too many fail, and a material proportion of unprofitable sales is mainly attributable to neglect in presenting goods in the most satisfactory manner. To aid in grading fruits to the best advantage it must be assumed that the preliminaries of successful cultivation have received due attention. The selection of the best varieties, suitable sites and soil, with every possible care in protecting the trees from attacks of insects and diseases, demand the cultivators' utmost skill and unceasing watchfulness. Further, in preparing for the actual work of grading, the method and time of gathering should receive the strictest attention, or much of the other labor will be reduced in value. It is not sufficiently recognised how readily all fruits are injured by rough handling. Even hard unripe apples and pears are soon bruised, and not only do these marks show as serious defects in the appearance of the fruits, but the keeping qualities are also affected. One general rule applies to all fruits, and that is they should never, if it can be avoided, be gathered when they are wet, especially if they have to be packed for sending a long distance. In preparation for sorting, the fruits should be carefully spread on a table or bench, which may slightly slope to the front, and should be of a convenient height for the packer to stand and work. When experienced hands are employed some degree of sorting can be done at the time of gathering, thus saving further handling or removing all the fruit, and I think it would be well if the grower would in every case endeavor to reduce this to the minimum. Several matters have to be considered in the actual work of grading, and an intimate knowledge of the characteristics of varieties is necessary to secure the best results. The effects of seasons on large crops also demands

attention, for the second grade of one crop might rank as the first of another. It is impossible to lay down a rule that would constitute a standard equally reliable under all conditions, but a general idea can be given of the relative values under similar circumstances. I think the most important points in classifying the best fruits are:—Freedom from injuries and blemishes, good uniform shape and size. These two points are essential to all high-class fruit, and no defective, distorted, or undersized sample should be allowed in the leading grade of any kind. Color, in my opinion, is a special quality, which I feel sure always possesses a marked value in fruits for dessert. A richly-colored sample, though only of a moderate size, will, if free from defects, often possess a higher market value than a larger and duller sample. Some varieties may be sold in two grades, one large and dull or greenish yellow, and the other a size smaller, but in its best color; in which case I think the latter will command the larger price. This is true of many other fruits which have a characteristic color, and is, however, sometimes deficient in the larger sizes. I think mere size also may be a secondary consideration, provided the fruits are choice, free from defects, and in perfect condition for immediate use. This is especially true in the case of small packages of dessert fruit, such as the finest pears, plums of the green-gage type, ripe cherries, peaches, and nectarines. A special market must be at command for such samples, or they should be sent direct to the consumer or retailer. The bulk of fruit-grading will, however, be mainly concerned with variations in size, provided the essentials of good form and freedom from defects are secured. I think it is of the utmost importance to ensure that each grade is as uniform as close attention can make it, and then the full value of the work is most likely to be obtained. A quick eye and some practice will soon enable a packer to select the various sizes rapidly, and in a uniform manner. Apples in particular can be readily graded into several sizes, according to the variety of the crop. Occasionally four well-marked grades may be obtained, and in other instances perhaps three, while sometimes only two are obtainable. I think the difference of a quarter of an inch in diameter should constitute a well marked grade. I read some time ago that an American association had adopted as the minimum standard for first grade apples of the largest type 2½ in. diameter, while for the smaller type 2¼ in. is the minimum diameter for first grade fruits. In each case a quarter of an inch is allowed between the firsts and seconds. In practice I find it almost impossible to adhere to such exact grading. The general standard and range in size of the crop or variety must be judged, and the gradation founded upon this. I think these remarks especially refer to cooking or dessert apples equally well colored; but what has already been said about color should be remembered, and a special grade of uniform size may be selected where there is a proportion of larger fruit deficient in respect to color. Most of the details regarding apples are also appropriate to the grading of pears, but as a larger proportion of these are used for eating than cooking they are more adapted for disposal in small packages, and hence repay the greatest attention in uniform grading. Several qualities can usually be obtained from one crop, and it generally pays best to sell in two or three grades, only those rejected in the selecting process being disposed of in bulk. Even when large crops from old orchard trees are being dealt with a few dozen of the finest fruits carefully packed should help to raise the total returns considerably. Nearly all other fruits admit of some grading, even though it only be to the extent of excluding defective or malformed specimens. The results must yield a satisfactory reward for the labor and expense. Whenever fruits have to be transferred a distance by road or by rail the best culture and most careful grading may lose all their value through careless packing. I do not wish, however, to go into details about packing, but there are some important points worth remembering. Only perfectly sound fruit should be used. Packing should be done firmly, but without crushing. In packing fruit topping should strongly be discouraged. If the fruit is properly graded the results are likely to be far more satisfactory, and no opening is given for the grower to be accused of dishonesty. I think another question worthy of consideration is the branding or labelling, for when good fruit only is being dealt with the use of the words 'seconds' and 'thirds' is apt to give rise to a misconception that is unfairly against the sellers' interest. I think a very good method is to term the best 'selected No. 1.' and the other grades 'selected No. 2' and 'selected No. 3.' Something of this kind is necessary to indicate that the lower qualities are not refuse, but properly graded fruit. I think an association of growers should adopt a uniform system, and adhere to it, so that their brand may become known, and have a market value." Discussing the question, Mr. J. H. Knappein said that grading was essential. He endorsed the other views expressed in the paper. Mr. Victorson would have liked to have heard more about packing. He strongly advised packers to use wood wool in preference to the ribbed cardboard in packing fruit for export, as it was not so liable to bruise the fruit. All the members agreed with the general principles of the paper.

Northfield, February 7.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Williams, Dall, Goldney, Kimber, Kelly, Reynolds, and Mitchell (Hon Sec.).

EGG PRODUCTION ON THE FARM.—The following paper, written by Mr. Eastwood, was read by the Hon. Secretary :—"This matter is in my opinion very much neglected in South Australia and the other States, mainly due to the prosperity enjoyed by the farmers at the present time. With the return of lean seasons we shall no doubt see more attention paid to this and other by-products of the farm. To commence with, one requires a certain amount of knowledge of the matter to make it a success. The old idea that any old mongrel will pay as well as the better breeds of fowls has long since been proved incorrect. The main object of every poultry-keeper should be to get the maximum profit at the minimum cost. To do this, poultry must be managed as the successful farmer manages his wheat field, and not left to look after themselves. To prevent damage to haystacks, &c., by scratching it is well to have the birds in pens constructed with posts and netting 6ft. high, making provision for shade by planting a tree or two in each yard. A hedge should also be planted around the enclosure for a shelter. This is indispensable, as fowls will not be profitable if they are exposed to wind. The houses should be constructed in such a manner as to prevent the tick pest as far as possible. A good idea is to use inch piping in the place of wood, fastened together with bolts or rivets, and attach the galvanized iron by means of wire firmly twitched. The houses should not be too large, say about 7ft. by 4ft., and 4ft. in height. They should be supplied with handles so that they can be conveniently moved. This should be done at least once a week, and all droppings carefully dug in so as to keep the yard as healthy as possible. The perches should be tick-proof. To accomplish this, pass a piece of 3in. round galvanized iron through a jam tin and solder the join. Push one end into the ground, and place the perch on the other, making a hole half-way through the wood to receive the iron. A standard would of course be placed at each end of the perch and the tin kept supplied with water. Keep the fowls supplied with clean water in clean vessels, and keep it in the shade. The feed should not consist of wheat alone, as it is too fattening; it should only be given in the evening. The morning meal should consist of oats, pollard and bran, alternately. It is also advisable to mix a little finely-cut meat with the bran and pollard. Sheep's pluck or rabbits will do where they can be caught. A quantity of greenstuff should be provided, otherwise the fowls will not remain healthy. Shell grit and crushed bone should be provided to assist digestion. As regards breeding, almost any Mediterranean fowls are good; but from personal experience I favor the Leghorn, as they lay early, and lay their given number of eggs in a shorter time than other breeds, which saves expense in feeding. On no account should hens be kept after the third season, as after that age they will not pay for the feed that they eat. On the farm I prefer the hen to the incubator, as they require less attention. The best breeds for mothers are the Brahmas or the Cochins; but as these breeds are difficult to procure I would suggest the Wyandotte. In conclusion I would advise farmers to pay more attention to this branch of their business, seeing a good profit is obtained at a comparatively small outlay of labor and capital." Members considered this to be a very practical paper.

Stockport, February 13.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Nairn (chair), Stribbling, Megaw, Howard, Perry, Watts, Whitelaw, Connolly, and Murray (Hon. Sec.).

CLAYPANS.—Some discussion took place in regard to the trouble of claypans in otherwise good paddocks. Mr. Megaw said that he had carted a quantity of straw into an old dam, and when the water had evaporated, the straw now partly rotted, he spread over the hard claypans and worked it into the soil. This effected a considerable improvement. "Mr. Whitelaw made a practice of carting manure and any dry matter, sweepings, etc., right on to the patches of land in need of this material, and found a great improvement in the small paddocks so treated."

Watervale, February 6.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Scovell (chair), Smith, F. and J. Hamp, Ward, O. and P. Dunstan, Burgess, and Duke (Hon. Sec.).

WHEAT FOR DISTRICT.—Considerable discussion took place concerning the respective merits of a number of varieties of wheat. It was agreed that Yandilla King had proved to be the best yielder last season.

ORCHARD NOTES.—An informal conversation on orchard pests ensued. Mr. Dunstan mentioned that a small green fly had been attacking potatoes and other plants. They swarmed on the under side of the leaves and destroyed them. Mr. Burgess reported that mildew had been affecting the currant crops very badly. He thought the continued wet weather had favored the spread of the trouble. A member said he had found codlin moth grub in stringybark trees. Mr. Smith considered the grubs found were quite distinct from the codlin moth, but thought it was quite possible that if stringybark poles were used in orchards without removing the bark they would form excellent harbors for the codlin moth.

DECLINE OF PEAR TREES.—Mr. Smith tabled some pear leaves, some of which had "blighted off" from an unknown cause, and turned black. The trees were almost stripped of their leaves, the trouble beginning on the fruit spurs. One tree had a graft of a different sort on it, and this was not affected, although the rest of the tree was. Two kinds of pears were shown by Mr. Smith from affected trees. The trouble was evidently not due to hot winds, as these trees were sheltered, and were taken first on least exposed parts. Neither did ordinary spraying appear to be a contributing cause. Their very old varieties had the disease. They were situated in different parts of the garden, and intervening trees, being of different kinds, were not affected at all. He did not know the names of the affected varieties. The Secretary thought the disease was an old trouble, which had never been so bad before. [The Horticultural Expert replies—"I have examined the pears and the foliage which were submitted, but can discover nothing to suspect the injury to be caused by any insect or fungus. Without a good knowledge of the locality and the circumstances, one cannot venture to suggest with reasonable accuracy a reason for the decline of the trees."—Ed.]

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Kadina, February 6.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Malcolm (chair), Correll, Pedler, Paterson, Rose, Southwood, Weidenbach, and Speer (Hon. Sec.).

SAMPLES OF GROWING CROPS AND TAKEALL.—As arranged at the previous meeting members tabled samples of growing crops and gave particulars as to variety and prospects. Mr. Malcolm's first exhibit was a sample of Yandilla King wheat which had been taken from a crop of Mr. P. Roach. It was a fine sample, with heads about 6 in. in length and stood about 5 ft. high. It was one of the finest looking grain he had seen in the district, and gave promise of an exceptionally fine yield. He also tabled samples of Gluyas and Federation wheat from his own farm. There were signs of red rust on the flag of the wheat, but he did not anticipate that it would affect the grain. The crop was fairly thick. It had been sown late, but the ground had been well worked. The wheat was clean, and he anticipated it would yield about 25 bush. to the acre. The recent rains had helped the crops considerably. In his opinion late sowing gave the best results. If farmers desired clean crops they must fallow their land and work the ground well. Mr. Correll tabled a sample of a growing crop of Viking, of which he said 2 per cent. showed dummy heads. It was looking well about a fortnight ago, but since then had begun to go off. Mr. Goodall considered the dummy heads were caused by takeall, and this opinion was indorsed by other members. In portions of his crop he noticed patches which were badly affected by takeall, and was convinced that the only cure for it was to sow oats on land where it had made its appearance. He would suggest that as early as possible after the wheat had been reaped the land should be sown with oats. As a rule they would get a good return; but even if they did not, it would pay to grow oats to starve out the takeall fungus. Mr. Correll also tabled a sample of Federation wheat. This promised very well in the early part of the season, but was now very badly affected with takeall. The same remarks would apply to a sample taken from a crop of Yandilla King. The wheat was fairly free from rust, although oats growing in the same paddock were badly

affected with rust. He also tabled a fine sample of Algerian oats, about 5ft. in height. This was grown on land which last year was badly affected with takeall. It was sown early. The wheat stubble was merely burnt off and the oats drilled in with about 56lbs. of super., with the idea that it would do for green feed. As he did not require to cut it for feed, he had left it for hay. It was now being cut, and would average, he thought, about 3 tons to the acre. He had never had a failure with oats. He would like to see the problem definitely solved as to what was the cause and the cure of takeall. He had been informed that some farmers had noticed white ants at the bottoms of the stalks in wheat, and that, in the opinion of some, takeall was really caused by white ants. He was, however, inclined to the opinion that white ants only attacked the roots when they began to decay as the result of takeall. He had noticed that the wetter the season the more prevalent the disease was. Mr. Goodall was of opinion that a cure for takeall had already been discovered, and that was by growing oats for a year or two on land which had been affected. He agreed with Mr. Correll regarding white ants, that they did not attack the wheat plant until decay had set in. Regarding a weed tabled by Mr. Correll, he would strongly advise any farmer who had it to get rid of it at once. There was no weed which would choke the comb of a harvester or reaper worse than this so-called "nanny weed." In some places it had proved to be a great nuisance in harvesting. It should either be pulled up, or the crop in which it was growing should be cut for hay. Mr. Pedler tabled a fine sample of Marshall's Hybrid wheat, about 5ft. in height. It was the first time he had grown this variety, and he was convinced that it was well suited to the district. It was an early variety, matured early, and gave promise of yielding well. The second sample tabled was Federation wheat, about 4ft. in height. It was a fine sample, healthy, vigorous, and with fine heads. He had noticed a few specks of rust in his wheat, but was of the opinion that it would not affect the grain to any extent. He also tabled a splendid sample of Yandilla King wheat. This was a part of a crop of about 70 acres, sown with 1½ bush. to the acre and was cross-drilled. It was looking extremely well. He was not troubled with takeall to any extent this year. The whole of his crops was on fallow land. In reply to a question by Mr. Goodall, he said he had not noticed any black rust (flag smut) in the early sown crops. Mr. Weidenbach tabled four exceptionally fine samples of wheat. The first was Marshall's Hybrid, taken from a crop of about 37 acres on fallow land. The whole crop would average over 5ft. in height. There were a few patches of takeall in the paddock, but nothing very serious. It was free from rust. The second exhibit was Marshall's No. 3, which was also over 5ft. in height, and the crop was looking extremely well. It was sown a fortnight later than Marshall's Hybrid, and was free from rust. A sample of Yandilla King, sown in April on stubble land, revealed promise of a fine crop, being a good height and with full ears. There were signs of flag smut in places, but it was not anticipated that it would seriously affect the yield. The fourth exhibit was Viking wheat, about 3ft. 6in. in height, which gave promise of producing a fine crop. This wheat was being grown on land which had not been fallowed, but was sown in July. Considerable interest was manifested by the members in the samples of wheat tabled, and an interesting discussion followed.

Moonta, February 10.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Orloff (chair), Browning, E. H. and F. Nankivell, Griffin, Cooper, Atkinson, and Laidlaw (Hon. Sec.).

HAY-MAKING.—Mr. Atkinson read a paper on hay-making from the *Journal*, and considerable discussion followed. Mr. Atkinson thought it best to cut the hay just as the flower was falling. He mixed oats with the chaff for horses. It was inadvisable, he thought, to stook immediately after the binder in this district, as the sheaves were liable to mildew in the centre. He was accustomed to cover his stacks with straw, the latter being tied down with wire. Mr. E. Nankivell was of opinion that Marshall's No. 3 was the best wheat for hay in this district. It was not so liable to rust as some varieties, and was a good wheat for grain. He let the hay grow until the corn would weigh about 54lbs. to the bushel before cutting it. Mr. Brown had not found wiring on the straw to be a success. The rain got down fully 5ft. where the wires had been. He preferred to peg the stack and then lay on the straw. He found that local buyers of chaff preferred a mixture of oats and wheat. He had sown these two cereals together, and reaped splendid crops. Members were generally agreed that the hay was best if left till the grain weighed about 54lbs. to the bushel, and that hay should not be stooked immediately after the binder; but they thought that in hot weather, if a man had enough laborers to do the

work, the sheaves might be turned after lying in the sun for a few hours, and they could soon be placed in small stooks. They considered it should not be carted under 12 days. All agreed that wood or stone made the best bed for a haystack; straw held the moisture, and the hay was consequently liable to be damaged.

WESTERN DISTRICT.

Colton, February 4.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. P. P. Kenny (chair), M. S. W. and M. D. Kenny, Hull, Barnes, and McBeath (Hon. Sec.).

WEIGHING WHEAT IN BULK.—Mr. Hull read a paper in which he referred to a movement to establish weighbridges and have grain weighed in bulk. He considered these should be erected by district councils, and that although each would cost £80 or £100, the expenditure would be justified, and would more than pay the farmers. At present they were not paid for half-pounds of wheat where the bags weighed an odd half-pound, and this amounted to a good deal on a thousand bags. He considered it unsatisfactory that the buyer should weigh the wheat instead of the seller. A storekeeper would not tolerate his customer bringing his own scales and weighing his purchases. The slightest suggestion on the part of a farmer that the scales were registering light caused buyers to regard him as a suspicious person, and made matters unpleasant generally; yet many farmers were certain that their wheat weighed more than they received credit for. If a charge of 5s. per thousand bags were made at a station or centre where 20,000 bags were sold, the interest on a £100 weighbridge would be assured. Members considered that Mr. Hull's proposals were in the right direction, and that ultimately some such arrangement would be made.

Elbow Hill, February 11.

PRESENT.—Messrs. Cooper (chair), Hyles, Ward, J. B. and G. F. Wake (Hon. Sec.).

HAYSTACKS.—A general discussion took place on the construction of haystacks. Mr. Hyles always placed the heads of the sheaves outwards, then he found they did not slip so badly as if they were placed the other way round. Mr. Wake also made a practice of placing the heads outwards to prevent slipping, although he understood that the correct way to build a haystack was to put the sheaves with the butts outwards. Mr. Cooper placed the sheaves with the heads inwards and experienced no difficulty in the way of slipping. He also put a load of straw on the top of the stack to prevent damage from rain.

CHARLOCK.—Some discussion took place regarding this weed. Mr. Wake had known land to lie idle for five years and then when it was fallowed a tremendous growth of charlock resulted. The general opinion seemed to be that the way to eradicate it was to fallow deeply and then give the land frequent light workings.

Koppio, February 9.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Gardiner (chair), Price, M. and G. Howard, Thompson, M. Gardiner, and Brennand.

STOCK AS AN ADJUNCT TO WHEAT FARMING.—A paper on "Farm Stock" was read by Mr. M. Howard. Every farmer would agree, he said, that it paid to keep sheep. They kept down weeds, enriched the soil, supplied the home with mutton, and their wool brought in a good sum of money. To be successful with sheep they must be given a

change of pasture from time to time. The farm should be divided into small paddocks and kept free from rabbits. If the sheep were moved from one paddock to another every month they would generally have some fresh grass. It paid handsomely to sow about 1 lb. of lucerne and 1 lb. of kale per acre with the wheat, as the farm would then carry more sheep and early lambs would thrive, while the wheat crop would not be harmed. The Merino was the most popular sheep in this district at present. Probably this was because the expenses entailed in exporting crossbred lambs were too great to allow of a reasonable profit being made. He would select Merino ewes for breeding, with long wool down to their feet, but not with very long wool on their legs; they should also have clean faces. These ewes should be mated to good strong-woolled rams—about 50 ewes to each. The wethers should not be allowed to run with the breeding ewes, because they worried them too much. It paid to breed crossbreds for mutton, as they weighed as much when a year old as an average full-mouthed Merino. He liked the Shropshire-Merino cross for this district. The lambs matured quickly, carried a good fleece, and did not trouble the fences much. Care was necessary not to mix the ewes that were mated to Shropshire rams with the Merino breeding ewes, for if a ewe which had had a lamb by a Shropshire ram were mated to a Merino ram, she would be likely to throw lambs with black faces and legs, and with wool as coarse as the first crops. General discussion followed, with various expressions of opinion as to the best crossbreds. Some members favored keeping to one breed.

EXHIBITS.—Mr. Price tabled samples of Kaffir corn, broom corn, and sheep parsley of excellent growth. This last, he said, required very little cultivation, and thrived well on his farm. Members thought these fodders were of considerable value, and would make good ensilage. Mr. Howard tabled some lucerne, both green and in the form of hay. Members agreed that it was very wise to sow a few pounds of lucerne seed with the wheat.

MIXED FARMING.—The Chairman spoke of the value of peas, potatoes, and fodders as side lines on the farm. He was convinced that on some farms those products would prove more remunerative than would wheat. Many farmers who gave all their attention to wheat-growing were neglecting some much more profitable crops. Members agreed that this district appeared quite suitable for raising these crops, and that it would pay well to grow them for stock feed.

Shannon, February 11.

PRESENT.—Messrs. Proctor (chair), M. T. and J. Cronin, Glover, Gordon, H. and F. Proctor, T. and E. Smith, Dollard, and J. J. Cronin (Hon. Sec.).

CONSERVATION OF WATER.—The following paper on this subject was read by Mr. Gordon:—"Now that the harvest is practically finished it is time we directed our attention to the all-important question of the conservation of water. Most of the farmers in this and surrounding districts have had some experience in water-carting over bad roads, and they know that it is an expensive business. A few farmers have tried boring for water, but up to the present time they have not been successful in obtaining good supplies suitable for stock. I think the safest method of obtaining a water supply here is to sink dams; and in this district, where we get from 16in. to 20in. of rain yearly, and as the quality of the soil is suitable for holding purposes, very little difficulty need be experienced in sinking a fair-sized dam. The most important item is to select a suitable site. It should not be where the water drains from a stable or a cowshed, as nothing will produce blood worms more quickly than the slush from a stable. I also think it a wise plan to have a catchpit, so that rubbish will not be able to get into the dam itself. I think a dam measuring 2 chains long by 1 chain wide and 12ft. deep, with the two sides as steep as possible, is suitable for the majority of farms. If possible it should be fenced and wire netted, to keep the stock and vermin out. The water is much cleaner if the stock are kept out, and it will last longer if it is pumped into a trough near to the dam. A dam of the size mentioned could be made in from two to three weeks." Mr. Cronin, in discussing the paper, said he preferred not to have the sides of a dam too steep, as it made the work very rough on the horses. He thoroughly agreed that the dam should be fenced and the water pumped out by means of a windmill. A serviceable mill and pump could be purchased for less than £20. Mr. Proctor had tried several bores on his farm, but had been unsuccessful in obtaining a supply, and had to resort to dams. He favored a fairly large dam with a windmill to draw the water out. Several other members spoke of the importance of having a good water supply on the farm.

Utera Plains, February 11.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Gale (chair), A. and C. Venning, G. and A. Barber, J. and N. Guidera, Branack, J. and M. Abrook, H. and T. Hornhardt, West, Holmes, Lee, Stephens, Naughton, Sinclair, Ramsey (Hon. Sec.), and five visitors.

PICKLING WHEAT.—A short paper on this subject, written by Mr. Hornhardt, was read and discussed. Since using fungisine as a pickle for his seed wheat he had had very clean crops. He followed the directions carefully in using this preparation, and found that one great advantage was that he could drill in the seed two hours after pickling it. The wheat came up more quickly, and there was evidently a better germination than when bluestone was used. He was unable to find any trace of bunt in the crops grown from seed treated with this pickle, neither was there any flag-smut. He had only used this preparation one year and therefore could not say whether it was an absolute preventive of flag-smut; but, having had such good results, intended to use more of it this season. Mr. Ramsey, who had also used this preparation, had not had such good results as had Mr. Hornhardt, and he thought that bluestone was as good as fungisine.

[For results of the tests conducted by the Department with various pickling solutions see page 491 of January, 1910, issue of the *Journal of Agriculture*.]

TAKEALL.—A brief discussion on this wheat disease took place. Mr. Abrook thought it was caused by continual cropping and consequent exhaustion of the soil. The disease was not much in evidence after a dry season; but after good years, when heavy crops had been taken off the land, it made its appearance. The Hon. Secretary said that the main cause was the continual cropping with wheat, and that the difficulty should be largely reduced by growing oats, barley, and peas as rotation crops.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Lameroo, October 1.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Trowbridge (chair), Hannan, Leckie, Sinclair, Jeffrey, R. and F. W. Eime, Cameron, Wray, Messenger, Thyer, Dunstone, Mead, S. G. Trowbridge, and Koch (Hon. Sec.).

VETERINARY EXAMINATION OF STALLIONS.—A paper on "The Government Inspection of Stallions" was read by Mr. Trowbridge. At the outset he quoted from the regulations under which the examination was made, and proceeded to say that, in his opinion, the requirements of the regulations were reasonable. Farmers should not complain, as it was very evident that some action was needed to prevent the importation and use of stallions that tended to lower the standard. Horses which were rejected at the shows of the various agricultural societies should not be allowed to travel for hire in the next season, but if the owner wished to keep them for his own use he thought no one should interfere. He therefore felt unable to support any proposal to insist on the castration or destruction of animals found to be unsound. If they were prevented from travelling a great deal would be accomplished, and the quality of the horse stock would at once improve. The Government veterinary surgeons were doing a lot of good work, and were doing it creditably and with considerable tact. He quoted figures to show what a large percentage of animals examined had been refused certificates, and urged members to exercise the utmost care not to breed from unsound stock. Members were divided in opinion as to the efficiency of the existing arrangements for the examination of stallions.

Lameroo, January 14.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Trowbridge (chair), Cameron, Shannon, Needs, Thyer, Leckie, Gibbon, Eime, Wray, Hannan, Ross, Koch (Hon. Sec.), and one visitor.

TECHNICAL EDUCATION.—Mr. Cameron read a paper showing the value of exact knowledge in the science of agriculture. Having spoken of the importance of a good primary

education and the work of Universities, agricultural colleges, and the Agricultural Bureau, the paper continued:—"The sandy soils of this district form the topic for the greater part of the local convention. Whether it is on the road or in the field, the soil requires a great amount of study. From the scientist we learn that it is very deficient in organic matter and potash—a great want, and very important to the wheat plant. Who knows but that a scientific man may evolve a product that will be of untold benefit to all who have sandy soil. Students will be working in the light and not in the dark, so that if an accidental discovery is made the student will know how to apply it and give sensible reason, that the neighbors may benefit. There is a fortune for the man who will discover the best fertiliser for sand. A knowledge of machinery is good, especially in these days when so many new inventions are abroad. Technical education gives an intelligent conception of and how to manage the implement under care. What expense, what time is saved, when knowledge is brought to bear!" The writer then went on to enumerate the many parts of farm work and life which were better understood and more fully utilised by a thorough technical knowledge. He urged farmers who could afford to do so to send their sons to the Agricultural College, and concluded as follows:—"Let your sons obtain the knowledge that will enable them when starting farming to run the shortest way to the goal we are all more or less aiming at—a good farm that will bring in a good income and that will result in a retiring allowance. Two young fellows who had taken the course right through the Roseworthy College obtained a block of land in the Lower North, and farmed as they had been taught, to the great amusement of their neighbors for a while. After the harvests came round, so did the neighbors, and one and all took to copying the youngsters. So it always will be. Education on these lines will always bring its followers out on top." In the discussion which followed Mr. Eime thought that as a rule farmers' sons were so valuable as farm hands at the age of college students that this was the reason why more did not attend college. Mr. Shannon believed that farmers should send their sons to college in all instances where it was practicable, as their knowledge would be much greater when they returned, and they would be of more use.

Monteith, February 11.

PRESENT.—Messrs. Travers (chair), Redding, McAskill, Magor, Smith, Wells, Connell, Male, Rowan, Pinchbeck, Gardner, Gunn, Bell, Nancarrow, Eldridge, Hannaford, Gregory, Bidjarano, Murphy, Martin, Blake, Clark, Gunn (Hon. Sec.), and nine visitors.

POULTRY-KEEPING.—An address on this subject was given by Mr. Hannaford. Having dealt with the questions of a site for a poultry run, the provision of shelter and suitable houses, he spoke of the importance of securing good birds of a recognised laying strain. When it was desired to introduce new blood into the yard he recommended doing so by the hens. It was not possible, he said, for all to buy competition winners, but they could be bred. He would test pens for 12 months or for six winter months before breeding from them. An incubator with a capacity of 120 eggs he considered best for the average farmer to use, and liked one with two drawers. In the discussion which followed Mr. Redding said he preferred turkey hens to incubators. He put 15 eggs under each turkey, and took the chicks away as they were hatched. He put fresh eggs under the turkey, and so kept her at it for four months.

Morgan, February 11.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), Hauser, R. Wohling, jun., Keough, Heppner, Marshall, H. Wohling (Hon. Sec.), and one visitor.

MIXED FARMING.—The Chairman read a paper on "Mixed Farming," and in order to show the advantages to be derived from this style of farming gave some idea of his experiences in this district. He commenced in 1888, and for 10 years endeavored to raise cereals without any great results. While 1889 was an excellent year for the district, unfortunately he had no crop. In 1890 he put in 160 acres of wheat. It did fairly well, averaging 11 bush. per acre, while some of it he cut for hay. Then the bad seasons came, and through all these years he had to cart water for the stock and household purposes, and also had to cart feed for stock from Freeling. He had as much as 500 acres under crop in some years, but reaped barely enough for seed and fowls' food. In 1908 he purchased 100 sheep, and that proved to be a very profitable step. Farmers in this district,

he said, should keep in addition to sheep, poultry, a few pigs, some cattle, and hogs. The dairy produce and poultry would keep the house going, while the stock would keep the farm and returning a little profit to the owner. A small area of land should be cropped every year, as some seasons were favorable and good returns might be reaped. In any case sufficient hay should be produced to keep horses and cattle alive, and enough wheat for the poultry and pigs. In this district a man could keep 100 to 200 sheep according to the quantity of land held. The wool and the lambs would pay for the sheep before very long. There would always be a supply of meat for the farm, costing much less than purchasing it from town. In a season when there was a good grass crop and perhaps very little wheat reaped the sheep and horses raised would keep the farm going. He could easily give statistics if they were required to show that mixed farming might be the salvation of those who were in low water in that district, but he could assure them that if they would give mixed farming a trial they would never regret it.

Parrakie, February 4.

PRESENT.—Messrs. F. J. Dayman (chair), J. Dayman, O., C., and H. Heinzl, A. A. and P. J. Halls, F. and W. Threadgold, Bottroff, Morrison, Lee, Diener, Burton (Hon. Sec.) and three visitors.

HARVESTER v. STRIPPER.—Mr. Diener read a paper on harvesting machinery. A good deal of prejudice existed, he said, against the complete harvester, but it was gradually being overcome, and he had no doubt that in a few years the harvester would have completely displaced the stripper. If it was desired to save the "cocky" chaff, this could be done by rigging up a contrivance at the rear of the harvester. A few pieces of light timber were required for the main supports, matchboard for the bottom, and some hessian for the sides and the top. One great recommendation for the harvester was that it could be used several hours before the stripper on wet days in such seasons as the last. Then, again, if it was wet enough to suspend harvesting, a load or two of grain could be carted to the buyer. While he recognised many things in favor of the motor winnower, he still thought they were a long way behind the complete harvester for the requirements of the average farmer. At least four men were required to work the motor winnower properly, and the average farmer did not want four men to clean his wheat when he could easily do it himself with the harvester and four or five good horses. A great objection to the motor winnower was the time and strength required to move it from one place to another. In this class of country it took four horses to move it even a short distance. Most farmers wished to get the crop off with as little outlay and as little delay as possible, and for this purpose the harvester was best. Although it had been said that the country here was too rough for harvesters, he was of opinion that with ordinary care a machine ought to last 10 or 12 years, with little or no repairs. Mr. F. Threadgold preferred to use strippers and a motor winnower, but the majority of those present considered the complete harvester the best machine to take off their crops.

Renmark, January 18.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. Waters (chair), Smith, Smeaton, Nuthall, Muspratt, Basey, Dix, Cole (Hon. Sec.), and two visitors.

OIDIUM IN VINES.—The Horticultural Expert delivered an address at this meeting on the subject of oidium. A number of questions were asked by members. Mr. Quinn said that in the blocks inspected by him where the disease was doing most damage, the conditions were favorable to its development. The land was low lying, the soil was strong and plentifully supplied with moisture, and the vines were thick with foliage. In some instances also the vines were shaded from the afternoon sun. This was a decided disadvantage, as oidium was unable to survive a high temperature. Among other preventive measures Mr. Quinn recommended clean cultivation beneath the vine trellises, and suggested the provision of more fruit wood. Tanks might be used, he said, in which to burn the cuttings between the rows of vines.

Renmark, February 13.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. Waters (chair), Taylor, Huggins, Cunningham, Everard, Geniste, Braund, Pike, Basey, Smith, Cole (Hon. Sec.), and one visitor.

HORSE COMPLAINT.—Members were much concerned by reports received of the loss of horses from some unknown complaint. Animals to the value of £600 had succumbed

to the disease. It was decided to ask the Chief Inspector of Stock to send a veterinary surgeon to make investigations.

A FAREWELL.—Members took this opportunity to extend hearty good wishes to Mr. E. E. Smith, who was shortly leaving for Malacca. Mr. Smith, in acknowledging the expressions of good feeling, said that every settler ought to belong to the Agricultural Bureau. All had something to learn, and the exchanging of ideas at the Bureau meetings was most helpful and practical.

Sherlock, January 14.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Whyatt (chair), V. A. and C. J. Osborn, Wood, Arbon, Nock, J.P., A. E. and A. E. Tonkin, Coombe (Hon. Sec.), and four visitors.

EXAMINATION OF STALLIONS.—Discussion took place respecting the examination and certification of stallions in regard to hereditary soundness, and the following resolution was passed, viz. :—"That in the opinion of this Branch it should be compulsory for all colts to be examined at two years old or younger, with a further examination for those that pass when they are four years old. All rejects to be emasculated." It was further agreed that a practicable system of insurance should be provided to cover all colts that passed the first test as two-year-olds against loss to the owner should they be rejected at four. Members considered that while this would entail a great deal of expense to the Government, it would be effective in checking hereditary diseases, and would save the owners a great deal of loss. The Government Veterinary Surgeon would come into closer contact with farmers, and could give valuable hints regarding common diseases.

FARM LABOR.—The Hon. Secretary initiated a discussion on this subject. He read the address given by Mr. W. L. Summers at the Annual Congress, a report of which appeared in *October Journal*. The system spoken of by Mr. Dawkins in that issue was especially favored by members. If the workmen, whether married or single, were provided with a home, practically their own, and allowed to keep cows, poultry, &c., the difficulty of obtaining and keeping workmen would be reduced to a minimum. If the wives and families of married workmen from the city could accompany them, the children would grow up with an insight into farming, and would be healthier morally and physically.

Sutherlands, February 11.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Snell (chair), Mibus, Noack, Heansler, Twartz, Byrne (Hon. Sec.), and two visitors.

MOTOR WINNOWER.—The advantages of using a motor winnower were outlined by Mr. Twartz. He had one working on his farm, and it had proved very satisfactory. The saving in labor was considerable. He cleared 60 bags of grain in an hour, and made a better sample than by the old methods. The motor was also useful for cutting wood and chaff.

LOOSE r. SHEAVED HAY.—Discussion on the relative values of loose and sheaved hay was introduced by Mr. Badge. Members were of opinion that sheaved hay was the better for ordinary farm purposes.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, January 10.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Chapman (chair), C., G., and I. Ricks, Lewis, T. and A. Jacobs, Brumby, and Curnow (Hon. Sec.).

STARLING PEST.—The position in regard to this serious bird pest was put by Mr. Lewis as follows :—Starlings were breeding in every hollow tree in the hills, and their numbers each year became vastly increased. No one seemed to raise a hand to check

the increase, and unless the Government took the matter in hand it would become impossible to grow certain kinds of fruit at a profit. He was not a large cherry grower, but this season he had lost over £12 worth. The pest started eating the fruit as soon as it showed the least color. Mr. Curnow said they did enormous damage to the early apples, especially Irish Peach, Gravenstein, &c. They knocked the fruit on to the ground and then scooped the middle out. Mr. Chapman also recognised the great amount of damage done. Mr. T. Jacobs, however, maintained that the starling was worth his hire every time. The fruit eaten was as nothing compared to the benefit the birds did in the fields and meadows in insect destruction.

RABBITS.—Mr. T. Jacobs spoke on the rabbit pest. Some local landowners were doing nothing to control the pest, consequently the district was overrun with the vermin. It was not only the grass eaten by the rabbits that was lost, but no stock cared to depasture over the feeding-grounds, as the smell of the rabbit seemed absolutely to poison the feed for big stock. He knew of 100 acres that would carry 40 sheep, but owing to the rabbits did not carry one. During the past four weeks he and his boys had killed 390 rabbits.

POTATOES.—Mr. A. Jacobs asked if it was advisable to cut seed potatoes for summer planting. Members agreed that unless the crop could be irrigated it paid better to plant whole seed. If cut the sets were liable to shrivel up and would not germinate.

OVER-FAT SOW.—Mr. Jacobs asked how to reduce the excessive obesity of a stud sow. She tipped the scales at over 400lbs., and had given birth to 10 young ones on December 24th. Had it not been for the remarkably cool weather, he would have lost her. He believed in feeding a full diet to a brood sow, but unless he could keep this one at a much lower weight he would have to salt her down, as there was too much risk of losing her during parturition. Mr. Ricks said he had had experience of similar cases. His remedy was simply to reduce the food supply. He would give her 2galls. of wash instead of 1gall. as at present.

Forest Range, February 9.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. Green (chair), A. J. H. and E. Green, Pollard, Sass, Rowley, Tribe, Vickers, and Monks (Hon. Sec.).

APPLE-GROWING.—The following paper on "Apple Culture" was read by Mr. E. Green:—"The most essential factor in the production of apples is the selection of a suitable piece of land on which to establish the orchard. Choose, if possible, a position that is well sheltered, with just sufficient slope to ensure good drainage. The more level the ground is the more easily and cheaply it can be cultivated, and when the trees arrive at fruition and need spraying it can be accomplished with greater ease. It is also easier to gather fruit from a fairly level orchard, so that it is quite apparent that in order to produce apples economically gentle slopes should be chosen. The land should be good, the most favored being the brown or chocolate colored soil with a good clay subsoil. The first step is to clear the timber and undergrowth, and that, on our heavily timbered virgin land, is an expensive and laborious undertaking. This having been accomplished, the ground should be broken to a depth of at least a foot; 14in. or 15in. would be better still. There is a growing tendency with orchardists to be satisfied with shallow cultivation, and many of them only break the ground from 8in. to 10in. deep. While the trees in many cases seem to do fairly well with that treatment, it is very questionable whether they will stand the test of time. As an apple orchard requires planting only once in a lifetime, surely it will pay to prepare the land thoroughly, so that no risks are taken! I would advise planting the trees 18ft. apart, and would put them on the square, so that they can be cultivated from different ways. Also allow wide headlands for the horses to turn when cultivating. Take care that the trees you plant are young, healthy, and well grown. On no account plant inferior trees because they may be obtained at a cheaper rate. A poor tree is dear at any price. It is well when buying trees to deal with a nurseryman whom you know is reliable, or you are very likely to be disappointed. When planting, give each tree a good allowance of bonedust. It is of the greatest importance also that only the best varieties of apples should be planted. Apples will often vary in price from 2s. to 6s. per case, according to the variety; therefore grow only the best varieties, since the same amount of labor and space will suffice for each. It is rather difficult to say which are the best varieties on account of the varying conditions under which they may be grown. A variety that will do well in one orchard may be a failure when grown only a little distance away. So the grower must be guided as much as possible by local experience. The following is a list of varieties that can be relied upon to give good results when grown in most localities. William's Favorite, Worcestershire Pearmain, Emperor

Alexander, Jonathan, Lady Daly, London Pippin, Buncombe, Rienette du Canada, and Rome Beauty. All of these are prolific bearers of fruit that can always be sold readily, and usually at a remunerative price. They are all well suited for local market requirements, and, with the exception of the first-named variety, they are excellent sorts for export—a trade which must of necessity be largely catered for by those who intend planting extensively; otherwise the local markets will soon be overstocked. When planting, it is a good plan to keep the varieties together in blocks. Having them scattered all over the orchard makes it very inconvenient for spraying, &c. The ground should be ploughed at least once a year, and frequently scarified and harrowed. Few things respond better to good cultivation than do young apple trees. It is not advisable to grow crops of hay, and field peas amongst the young trees, for those crops take from the soil much that should go to the trees. The growing of these crops also prevents the growers from giving the young trees the cultivation that they require. I would prune the young tree to about 18in. or 20in. from the ground when planting, to make a short stemmed tree from which low trained and well balanced branches can be developed. When the trees are six or seven years old I begin spur pruning. It is not advisable, in my opinion, to prune trees with the object of making them bear fruit while young. Early fruiting of trees should not be obtained at the expense of the future tree." In the discussion which followed Mr. H. Green indorsed the views expressed in the paper. He would cultivate the soil in November, and did not believe in doing anything that would tend to stunt young trees. Mr. Vickers noticed that the list of varieties given did not include Cleopatras. He wondered whether growing hay between the trees would not be a good thing, as it would help to stunt them a little. Mr. Rowley had grown hay and field peas between trees, and he thought it was a help. He got some return from the ground while waiting for the trees to bear. If bonedust was applied he did not think the trees would suffer. Mr. J. Green agreed with a good deal of the paper, but did not think Emperor Alexander apples were suitable for export. He would rather grow hay than peas between trees. Rokewood, he thought, should be included in the list of good varieties. Mr. H. Green considered it was unwise to grow hay amongst the young trees. Where it was possible to grow potatoes they were of considerable benefit. Mr. Pollard said it was all very well to advise not to grow hay and other stuff between young trees, but most beginners had to do so. He grew garden peas. Mr. Monks thought 18ft. square was not enough distance to allow between trees; 20ft. was quite close enough. It was much better to break up the soil 18in. deep, to allow the roots to penetrate deeper and more easily. He would not plant in blocks, and would not put more than two rows of each variety together, so as to provide for cross fertilising. There was more in that phase of the question than was generally imagined. The Chairman agreed with most of the paper, but thought it difficult to get a slope for planting that was so perfectly drained. He knew of fairly steep hillsides that had runs of water, and required to be drained almost as much as some flat land. He was not in favor of breaking up the soil deeply before planting. He thought most growers applied manure when planting, but as a rule that was as far as they went. They should pay more attention to that part of cultivation. The cost of half a ton of manure was not to be compared with the results obtained.

WOOLLY BLIGHT.—Some discussion took place respecting woolly blight. Some members held the opinion that it came from the ground, whilst others thought it originated in the air. The expert's opinion was desired upon the matter. [The Horticultural Expert (Mr. Geo. Quinn) replies—"This insect (*Schizoneura lanigera*) is generally considered to be primarily a root louse, but it migrates from the roots to the tops if the apple trees are not on blight-proof stocks. Trees on blight-proof roots become infected on the branches by the insects passing from adjoining blighted trees. This change may, according to the British authority, Buckton, be made by the winged females flying through the air or by the crawling female forms, which are wingless. It certainly does not breed in the air."—Ed.]

Hartley, February 11.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Wundersitz (chair), Brook, Hudd, Pratt, Symonds, Stanton, D. and L. Clark, G. and T. Phillips, and Birmingham (Hon. Sec.).

HARVEST REPORTS.—Members reported that the harvest just completed had been rather poor. Takeall had reduced the average considerably. Yandilla King, Federation, and Barocota Wonder were about the best varieties for the district. White Tucan had done very well in one or two instances—yielding up to 14bush. One small paddock of Federation returned 30bush. to the acre on new land fallowed and well worked.

Another member reported that he had reaped 40 acres of Federation on fallow which averaged 24bush. to the acre. Oats yielded up to 30bush. per acre. Members thought oats did best if sown rather late, as they then did not grow so high, and were not likely to shake out. The rain and rough weather had done a lot of damage during the year. The Chairman said he had a fine crop of Huguenot which he cut for hay. The stock seemed to like it very well. He reaped a small plot of this variety and made a stack of straw. The cattle and horses were very fond of this. Members were unanimous that it paid every time to fallow wheat land in this district.

Longwood, January 14.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes (chair), J. and W. Nicholls, Glyde, Doley, Furniss, Oinn, Vogel, Pritchard, Coles (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—This meeting was held at the homestead of the Chairman. Mr. and Mrs. Hughes entertained members to tea.

WATTLES AND PINES.—While inspecting the property members were much struck by the appearance of a cultivated plantation of wattles. The trees had grown up to 12ft. high, while those planted in land which had been simply cleared and cultivated once were only about 4ft. high. Some Remarkable pines had been planted amongst the wattles, and seemed to thrive in the shelter afforded by the latter, while the wattles did not appear to have suffered. Mr. Hughes explained that the pines were deep feeders and the wattles surface feeders. The low-lying land on this property was devoted to growing various fodder grasses, and in separate plots were seen lucerne, clover, Yorkshire fog, &c., with facilities for irrigation. These were giving two and three cuts of green feed or hay each year.

APPLES AND PEARS.—Having disposed of details of business, members chatted about apples. Varieties said to have done well this year were—Latewine, Northern Spy, Emperor Alexander, and Five Crown Pippin. Mr. Hughes speaks highly of the value of Beurre d'Anjou pears.

STRAWBERRIES.—Discussion took place on strawberry culture, and it was said that all young plants with good roots were suitable to plant out. It was not necessary to use only those near the parent plant, and for cross-fertilisation Edith's were good.

CONDITION OF ORCHARDS.—The state of the orchards in this neighborhood was said to be very disappointing this year, excepting for pears. Apples were small, scabby, badly cracked, and there was plenty of codlin moth. Many of the trees suffered from the excessive wet of winter, and some appeared to have been burnt with the spray. Members thought this was due to their having been a fine prolonged rain following the spraying. [What spray solution was used where the trees seemed to be burned?—Ed.]

Mount Pleasant, February 10.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Giles (chair), Royal, Tapscott, Godfree, Phullis, Vigar, and Maxwell (Hon. Sec.).

THE CARE OF SHEEP.—A paper on this subject was read by Mr. Vigar. As a farmer who depended upon his sheep to provide part of his income he commenced his flock by purchasing Merino ewes which were in lamb to Merino rams, and due to lamb at the end of April and during May. Generally speaking it was wise to have the lambs dropped in May, as in most years there was some green feed for the ewes in that month, and it was very desirable to have this before the lambs were born. May was also a fairly dry month, and it was seldom that the ground had become cold and wet by then. Having made a start, it was desirable to work on fixed lines, rather than to change from one year to another. He put the young ewes to the ram as four-tooth, i.e., when they were two and a half years old, and continued to put them to Merino rams until they became full-mouthed. He therefore had at least two lambs from the ewes by Merino rams, and these kept the flock going. Then he passed the ewes on to a Lincoln ram, and kept on breeding crossbred lambs until they became broken-mouthed. Sometimes this happened after one crossbred lamb, but others would rear two or three lambs after becoming fullmouthed and would still retain a good mouth. As soon as a ewe became broken-mouthed he selected the best conditioned for household use, and sent the others to market, to go to the highest bidder. That was his main line in breeding, but there were many side issues to be attended

to. The lambs when about six weeks old had to be attended to. He then described his method of castrating lambs, and proceeded to say that at the same time he removed the tail. The proper way to cut the tail was to pull it lightly until the skin wrinkled, and then cut the tail off just at the end of the wrinkles. This would leave enough to cover the organs of the sheep. When 12 months old the sheep would have developed sufficiently for the farmer to form a pretty good idea as to what it was going to be. The weedy ones should be removed from the flock as opportunity offered. It was not wise to cull too heavily at this age, but there were always some which from some cause did not come up to the fair average standard of the flock. The crossbred lambs he bred for sale, and placed them on the market as soon as the grass died off. This was a very profitable part of sheep-raising. It was desirable if possible to sell the whole of the crossbred lambs in one line. In any case he would not remove more than a few of the very inferior ones, for in this district it was impossible to get a large percentage fit for the freezers in most seasons, and it was better to sell them in a line and let them go to graziers in country that would fatten them better. It was better for small sheepowners to hire rams from some breeder than to try to breed them, otherwise, even with good judges of sheep, there were sure to be a good many saved for rams that were not fit for breeding purposes, and had to be sold as stags or killed for dog's meat. By hiring rams an owner could change the blood as occasion required, at a small cost compared with the purchase of good rams. One of the most necessary factors in the get up of a clip was to have the sheep in good order for shearing. About a month before lambing all the ewes should have the crutch cleaned and their eyes clipped. This applied to all the flock, but with dry sheep it could be left until later. This would save a lot of work in the shed at shearing time, and also save a lot of wool, for dirty sheep on the board damaged a lot of wool that might easily be saved. It was necessary to watch the shearers at work and check as much as possible the ill usage of sheep and the second cut in the wool. The second cut in the wool was simply so much wool wasted. He would remove the bellies from the fleeces, and if it had not been done before remove the pizzles from the belly wool. Skirt lightly where necessary the leg ends and short, hairy leg bits, and throw out very heavy or very coarse fleeces with the belly wool. If the sheep were culled as they should be, there would be very few fleeces cast aside. Small owners should not try to class the clip in many lots, but simply keep the ewes with lambs separate from the dry sheep. If a small owner tried to class his clip on the lines of a station owner, he would find that when it reached the market it would be catalogued as star lots, and would not receive the attention from the buyers that it otherwise would. It was most important not to overstock. A paddock that had sheep in it should also carry a few head of cattle or horses, for on some classes of grass sheep would not do well, but heavy stock would thrive upon it. He thought that in a course of 10 years sheep paid better than either wheat or dairying in this district. The expenses of management were small and the returns were regular. Discussion followed. Mr. Giles pointed out that May had been a wet month for the last three years, and in such seasons it was doubtful if it was the best month for lambing, but members generally thought it best to have the ewes to lamb in May. It was also thought that the ewes should be culled within a month of shearing. The general opinion of the members was that the principles laid down in the paper were very suitable for this district.

CROP AND STOCK REPORT.—The Hon. Secretary reported that the crops in this district had been very poor, the average being barely 4bush. per acre. It had been a wonderful season for stock; green feed held almost right through the summer. The rainfall for year ending December 31st, 1910, had been 33.68in. For December, 1910, it was 3.23in., and during January, 1911, 24 points were registered.

FRENCH WHEATS.—Mr. Giles reported that he had reaped his French wheats, and the results were—Sensation, about 7bush. per acre, and Red Marvel, about 3bush. The low yield was on account of the winter being altogether too wet.

Port Elliot, January 21.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. Welch (chair), Green, Chibnall, Brown, Barton, W. E. and W. W. Hargraves (Hon. Sec.).

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. J. Brown, of Hindmarsh Valley. The fine garden, consisting of 10 acres of potatoes, vegetables, and fruit trees, was inspected by members. Everything seemed to be in first-class condition, and reflected great credit upon the owner. Mr. Brown irrigated his property by means

of water pumped from the river by a Blackstone engine. The water was distributed over the garden in pipes, and then directed through the rows of vegetables in plough furrows. A patch of paspalum and clover was much admired. The dairy cattle also looked well, and came in for favorable comment. At the homestead tea was kindly provided by the host and hostess, who were heartily thanked.

POTATOES.—Some little discussion on potato-growing took place. The general opinion in regard to seed seemed to be that for wet districts round sets were preferable; but where the soil was sufficiently drained to permit of the seed being cut, it was better to use the cut sets.

Uraidia and Summertown, February 6.

(Average annual rainfall, 42½ in.)

PRESENT.—Messrs. Rowe (chair), Richardson, Kessel, Prentice, Hart, Day, G. F. and H. F. Johnson, Hoffmann, Hawke, Cobbletick, Dyer, and Snell (Hon. Sec.).

PREVENTION OF IRISH BLIGHT.—Members wished to know particulars regarding the disinfection of seed potatoes by subjecting them to a dry heat. [According to the Victorian Department of Agriculture the tubers are heated to 120°-130° F. for three hours, and this dry heat destroys every trace of the blight and does not interfere with the germination of the potatoes. Members should read Bulletin No. 49, copies of which were sent to all Branches within potato-growing districts. See page 25 for description of this treatment.—Ed.]

SOUTH-EAST DISTRICT.

Frances, February 11.

PRESENT.—Messrs. Canacher (chair), Meehan, W. and A. E. Forster, O'Brien, Tompkins, F. A. and G. Holmes, Atkinson, Richardson, Watts, McGillivray, Pfizner, Brown, Feineler (Hon. Sec.), and one visitor.

WEIGHT OF BAGS OF GRAIN.—Considerable discussion took place concerning the railway regulation under which the bags of wheat weighing over 200lbs. were charged four times the ordinary freight. The Hon. Secretary considered that as a standard cornsack had been introduced by legislation, the Railway Department should accept these regardless of the specific weight. The Chairman said bags of wheat averaged about 190lbs., but individual bags sometimes went up to 215lbs. or 220lbs. in weight. Poor grain would only weigh about 170lbs. to the bag. Other members spoke in similar terms, and the following resolution was carried unanimously: "That this Branch of the Agricultural Bureau protests against the action of the Railway Department in charging extra freight on standard sacks of corn which are over 200lbs. in weight, and considers that the standard sacks contain only a fair average weight and should be accepted." It was further resolved to bring the matter before the Conference of South-Eastern Branches to be held at Naracoorte on March 29th.

Mount Gambler, February 11.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Sassanowsky (chair), Watson, Dow, Engelbrecht, Kennedy, Holloway, Wheeler, Major, Pick, Buck, Wedd, and Collins (Hon. Sec.).

DESTRUCTION OF FERNS.—Mr. Pick again read the paper he had submitted at the January meeting on destroying ferns on poor land, and Mr. Engelbrecht read the following paper on the destruction of ferns on good land:—"Mr. Pick in his interesting paper has fully demonstrated that ferns can be successfully dealt with on what is known as second-class land, used for grazing only. As this subject is of great importance to the district, a few details of experiments carried on by me on good land, as well as a few observations noted, may be of interest. My first experiment was with a grass mower. Selecting a ferny rise of rich red loam, about 10 acres in extent, and covered with ferns from

2ft. to 2ft. 6in. high, we started operations. Three days after cutting, the ferns were raked together and burnt. As soon as the young shoots were well above ground the operation was repeated, and at intervals on three different occasions. However, this was not a success, for so long as we kept worrying the young shoots they were kept in check, but directly they were left alone they came on as thickly as ever. A further experiment with a grass mower from which the swathe board had been removed was then undertaken. The ferns, instead of being raked together, were allowed to fall and form a carpet, the idea being to smother the young shoots. When this carpet was removed some months later it was noticeable that, while the grass received a severe check, the young ferns appeared to be uninjured. Having secured an old roller, to which iron rails were attached, we started our third experiment. The land was rolled from end to end, and then from side to side, and finally from corner to corner. In order to make a double experiment a couple of plough furrows were run through the centre, and then one-half was burnt and the other left as rolled. Although neither was a success, the unburnt portion showed less growth than the other. My next experiment was with a chain and a half of barbed wire, a horse being attached to either end. The loop was taken round the butt of the ferns, and both horses pulling together were supposed to beat and destroy the stems. (Owing to the horses not being used to the work, and the difficulty of keeping the loop at the base of the ferns, the trial was not a success, but we thought well of it and intended to experiment further, as where the wire got a fair grip the result was splendid. I have experimented very freely with the plough, having used the set plough, the stump-jumper, and disc, ploughing from 1in. to 8in. in depth, with no satisfactory results. Certainly the first season after ploughing the ferns are smaller and thinner, but if left for a second year they will be as thick as ever. I have, when sinking a hole on sandy country, come across fern roots at a depth of 10ft. from the surface. This may account for their exceptional vitality. Another instance which came under my notice was a path on a ferny hill on the Moorak Estate, which had been used for over 20 years, and was beaten as hard as any ordinary path. Some years ago this path was closed, and within three months the ferns began to shoot strongly, and within 12 months the path was completely covered. The late Mr. Thos. Williams, for many years manager of Moorak Estate, probably gave more time and spent more money than any individual in trying to find a means for the destruction of ferns at a reasonable cost. If he did succeed in keeping them down his work was not permanent, for the ferns are as thick as ever on the estate to-day. I am of the opinion that the ferny hills of our rich soil can only be kept under control by constant attention with the plough or other implements, there being really no permanent cure. If there is, and the expense is moderate, the discoverer might justly be deemed to be a benefactor to his country." The Chairman said Mr. Engelbrecht had made a good many experiments, but the ferns seemed very difficult to get rid of. He thought Mr. Pick's idea was as good as any that could be adopted on grazing land. Mr. Engelbrecht had tried the same plan that Mr. Riddoch had at Koorine, and there had been a success. It showed that in the stiff clay soil they could be destroyed, but that where the ground was loose or loamy it would be a difficult thing to get rid of ferns. Mr. Wedd agreed that the operations had to be repeated annually, as the ferns would shoot up every year. His best results had been from the use of the mowing-machine. It was necessary to know the right time of year to plough. If the ferns were cut at harvest time it would be a long time before they would grow again, and when the young growth did come the frost would kill it and give the ferns a great check. If that were done for three or four years, the ferns would become weaker and thinner. On Mr. Attiwill's property at Glenburnie, that was done, and the ferns died completely out. There was not a fern in his paddocks now. The success of ploughing the ferns depended a great deal on the subsoil. In a property at Ardno, with a clay subsoil, the disc plough turned the roots up to the air, and they died, and there was hardly a fern now on it; but at Mount Gambier they would grow again if left awhile. He thought that, taking the land as a whole, mowing was the most successful system. Mr. Ruwe's paddock on the Casterton Road was an absolute mass of ferns some years ago. They were mowed in the summer time and thinned out when the thistles came, and now there was any quantity of spear grass in the paddock, as well as other grasses. Although the ferns were not all dead, they were so weak and thin that they did not depreciate the land very much. Mr. Buck said burning was just what ferns liked. If they mowed the ferns and raked them together in strips and burned them, next season they would come up better in the strips. Cutting was too clean, the roots did not bleed enough; they needed bruising. When broken and not cut they would not come again. At Mrs. Coutt's hill there was a mass of ferns 30 years ago, and to-day there were none excepting along the fences. The land had always been ploughed and stocked with cattle. That was the only cure for ferns. Plough it over now and then,

and sow it down with barley or oats, and let the cattle feed on it all the winter; then put in potatoes, and give the ferns no show at all. Rolling was bruising, and he had done it with good effect at Naracoorte. Mr. Engelbrecht asked if that would apply to ferny hills. Mr. Buck replied that it would. The first year he ploughed them they were nearly 4ft. high. He cut them, let them wither on the ground where they fell, and set fire to them. He then ploughed the ground and put in oats. After taking off the crop he ploughed it again and put stock to feed on it. The ferns were coming again, but it was the tramping of stock they did not like. Mr. Kennedy thought ferns must be treated differently on different soils. At Kalangadoo ploughing seemed effective, but at Compton other treatment was required. He thought Mr. Buck's idea of bruising them most effective. Mr. F. Holloway said his experience differed from Mr. Kennedy's. He took the grass mower and mowed down the ferns before the crop got too high, and found that next year they did not grow. He thought ploughing was the most effective plan, provided it was done at the right time, and that was at this time of the year. Then if they sowed barley or oats it would soon kill them. But the best thing of all was to put pigs on the land and let them root the ferns out. They plucked the roots. He did not think cutting was any good at all, nor did he believe in burning. The Chairman said that in his country wherever they ploughed early the ferns came quicker in the crop than if they ploughed in the middle of April. If they ploughed them in April they would not grow again till September or October. If ploughed early they would come on again in August. In reply to the Chairman, Mr. Buck said that at Naracoorte they had a lot of poor soil, and a good many pigs. They put down half an acre at a time and turned the pigs on to it, and when it was well rooted up they would level it with a big sleeper and sow it down with turnips, and turn the pigs on another patch. It was pure white sand, but would grow a tremendous crop of turnips. He had been away from there six years, but last year he saw that no ferns had reappeared on those patches. He did not think that at Moorak the fern roots went down more than a foot or 15in. Mr. Major said he had been told that his land at Glenburnie was once covered with ferns 3ft. or 4ft. high, which had now been cleared off. But when they dug down they would find the old decayed roots 18in. below the surface. He had been out there nine years, and never saw ferns except in some spots. He believed in ploughing and cultivation on the good land. Mr. Wheeler had known pigs to do good work. He had one very rough paddock to deal with. He ploughed a firebreak round it at the end of January, and in February he burned it. Then they burned the inner portion. He mowed the young ferns as they came up, and then ploughed it very deeply and put in a crop. Next year the ferns were lighter. Then he put a disc plough in and ploughed it in January, and to day it was a different paddock, altogether very much cleaner. He believed that ploughing them in in very hot weather would still further reduce them. The Hon. Secretary said his best work with ferns had been ploughing and cutting. There was not a fern in his paddocks now. The Chairman summed up the discussion by saying that most seemed in favor of continual cutting and cultivation, so that people buying ferny land need feel no anxiety about it, so long as it was of good quality. Pigs were also useful, and bruising was effective.

Naracoorte, January 14.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Coe (chair), Williams, Loller, Rogers, Caldwell, Wright, Munro, and Langeludecke (Hon. Sec.).

EXPERIMENTAL GRASS PLOTS.—Mr. S. H. Schinckel forwarded a report on manual grass plot tests for the years 1909 and 1910. The experiments were undertaken on behalf of the Agricultural Department. The department supplied the manure and Mr. Schinckel did the work. There were seven plot tests of an acre each, and were manured as follows:—No. 1—No manure; No. 2—2cwt. of mineral super., 1cwt. of nitrate of soda, and 1cwt. of sulphate of potash; No. 3—2cwt. of mineral super. and 1cwt. of nitrate of soda; No. 4—2cwt. of mineral super. and 1cwt. of sulphate of potash; No. 5—1cwt. of nitrate of soda; No. 6—1cwt. of sulphate of potash; No. 7—2cwt. of mineral super. The results of the experiments last year had been compared with those of 1910. In 1909 No. 2 plot had shown the best results; No. 4, second; No. 3, third; No. 7, fourth; No. 6, fifth; No. 5, sixth; and No. 1, seventh. In 1910 the results were:—No. 2, first; No. 4, second; No. 7, third; No. 3, fourth; No. 6, fifth; No. 5, sixth; No. 1, seventh. Mr. Schinckel furnished the following report:—"Last January, when these plots were being fed off, the sheep rather made a camping-ground of plot 7. This, I think, is the reason why this plot this year is better than plot 3. The stand and growth

of clovers and Melilotus is ever so much better on the plots where super. has been applied than where it has been omitted. These plots will again be reserved during the growing period this coming season, to compare results with previous years." Mr. Wright explained that the plots were fed off in a uniform manner, after time had been given for the grass to grow. The manures were only used on the natural grasses, and no cultivation whatever was done. The good effects of the manures could be clearly seen on the plots compared with the surrounding country which was not manured. Mr. Rogers would like to have seen the cost of the manures for each plot, as he was anxious to know if it would pay. Mr. Wright did not think it would pay for grazing sheep. He thought it might improve the country he saw experimented with on Mr. Schinckel's farm to the extent of three sheep per acre.

HARVEST RETURNS.—Members spoke of the yields reaped in various parts of the district. Mr. Rogers said the yield on the Hynam Estate would average about 12bush. per acre. Mr. Williams said that in Lochaber the average would be not more than 10bush. per acre. Mr. A. Langeludecke said that in his portion of the hundred of Jessie—Kromper Paddock—about 6bush. would be the average. Mr. Loller's crop had turned out much better than he expected, yielding close on 30bush. to the acre. He had a very good five-acre crop of maize grown on red soil, which was cutting 20 tons of green feed to the acre. It had been grown on fallow ground and sown in September. Mr. Wright said the season had been very favorable for summer crops, and the wheat yields had turned out better than most people anticipated.

Naracoorte, February 12.

(Average annual rainfall, 22in.)¹

PRESENT.—Messrs. Coe (chair), Rogers, Loller, Wright, Bray, J. and R. Tolmer, Lange-ludecke, Caldwell, and Schinkel (Hon. Sec.).

CONFERENCE OF SOUTH-EAST BRANCHES.—A considerable amount of time was occupied in making arrangements for the Conference to be held on March 29th, and it was mentioned that the ladies of the district took a keen interest in the annual Conferences. An inquiry had been received as to whether ladies' branches of the Agricultural Bureau could be formed.

MANITOBA WHEAT.—Mr. J. D. Tolmer stated that he had received a small quantity of Manitoba wheat from Canada. It was the best grown in that country. He put the few seeds in about a foot deep, with a little manure, and it gave a prolific yield. Two varieties came up—one was bearded and the other was not. Samples of both varieties were exhibited. Both were very hard and dark in color, and he desired to ascertain the names of the two varieties. Mr. Schinkel said that Manitoba was a very hard wheat, but not bearded. Mr. Loller said the wheats were so hard that he questioned whether they had machinery in Australia to grind it into flour satisfactorily. Both varieties would make a very dark flour. It was pointed out that the hard wheats were used for mixing with the soft wheats. Mr. Tolmer said the samples grew in wet, spuey soil, and it seemed to suit the country at Hynam very well. They wanted to look out for a good wheat for the Hynam country, as Federation, which had been generally grown, had turned out a rank failure this season with takeall and rust. He sowed the Canadian wheat the second week in August. [This wheat, Manitoba, has been grown for several years at Parafield Experimental Station, and, although yields are not as high as the local wheats, they are very satisfactory. The milling of this wheat presents no special difficulty, and wheats are at present milled which are quite as hard as Manitoba.—ED.]

Penola, February 4.

(Average annual rainfall, 26½in.)

PRESENT.—Messrs. Peaske (chair), Strong, Ockley, Wilson, McDonald, and Adamson (Hon. Sec.).

CHOU MOULLIER.—Mr. Ockley tabled specimens of Chou Moullier, showing a growth of 10ft. for 18 months' growth. The specimen he grew on light country in the hundred of Comaam, and it was found to be a capital fodder for cattle. The average height of the plants for the whole field was about 6ft., and they were entirely free from aphids. He favored spring sowing.

FRENCH WHEATS.—The Hon. Secretary tabled samples of Red and White Marvel, taken from the experimental plots on his farm. The grain, more especially the Red Marvel, was a fine sample, being very plump. A four-acre plot of White Marvel grown from the previous year's seed had yielded 14bush. per acre, which he considered a good yield, considering the nature of the past season.

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All communications to be addressed:

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Potatoes for the West.

The regulations controlling the importation of potatoes into Western Australia have been modified by insisting that any potatoes sent to that State must bear a Government certificate declaring that they were not grown within 35 miles of any place where Irish blight exists or has existed. Previously the radial distance allowed was 50 miles. The ports of entry for potatoes in Western Australia are Carnarvon, Geraldton, Fremantle, Perth, Hopetoun, and Esperance. The potatoes must be in new bags branded with the name of the grower, and accompanied by the Government certificate signed by an officer of the Department of Agriculture, and stating that they have been grown 35 miles at least from any locality affected by Irish blight, and that they have been forwarded direct from the field to the ship. The signature on the certificate must be written, not stamped, and each certificate must show the number of bags in writing. Any percentage of decomposed or diseased potatoes, as may be determined from time to time by the Director of Agriculture or other officer, shall condemn the whole consignment.

Nodules in Beef.

The Minister of Agriculture (Hon. J. P. Wilson) has received a report from the Trade Commissioner in London describing the vehement attacks made on imported Australian beef by two English newspapers—*John Bull* and *Mrs. Bull*—on account of the discovery of “nodules” in certain carcasses from Australia. One of these papers stated that in consequence of its disclosures there was now a much better demand for English beef. So far had the organised agitation been carried that many of the motor ‘buses in London were placarded “Read *Mrs. Bull*. Beware of Australian beef.” Major Norton urged the High Commissioner to advise the Federal Government to prohibit the shipment of affected meat. The Minister of Trade and Customs (Mr. Tudor) is now considering the advisability of having an investigation made by experts into the prevalence of beef nodules, the area over which the cattle are found to be affected therewith, and the eradication of the trouble if possible.

Bitter or Brown Pit in Apples.

At the recent conference of Ministers of Agriculture held in Melbourne it was unanimously agreed that Mr. D. McAlpine (Vegetable Pathologist to the Victorian Department of Agriculture) should be asked to undertake the proposed investigation into the cause of bitter or brown pit in apples and pears, the cost of which is to be defrayed by the different States and the Commonwealth authorities. Arrangements were made for the appointment of a general committee of supervision, and it was agreed that the Government of each State should arrange for the State officers assisting in the investigation. It is hoped that the work will be started some time in July, and it is anticipated that it will extend over four or more years.

Lands Open for Selection.

The following repurchased lands are open to application up to April 18th :—Struan Estate, in the South-East, about 22,430 acres; University lands in the hundred of Tatiara, 9,850 acres, and Mount Schank and Binnun Estates, in the South-East. These lands are to be disposed of on agreement to purchase under the Closer Settlement Act. Crown lands in the hundred of Pendleton and other hundreds in the South-Eastern district are also open to application up to the 18th. Lands which will be open to application shortly are—North Boolorowie Estate, repurchased, about 33,580 acres; Moorak Estate, near Mount Gambier, 4,600 acres; and 126,000 acres in the hundred of Glynn, north of Franklin Harbor. About 186,000 acres in the hundreds of Hooper and Marmon Jabuk will be gazetted in a few weeks for application to purchase, or to take on perpetual lease. The Moorak Estate is some of the celebrated volcanic soil, and was bought by the Government from the trustees of the late Col. P. J. Browne for £31 10s. per acre.

What Birds Consume.

Birds digest their food so rapidly that it is difficult to determine just how much they consume during a day's feeding. E. H. Forbush, of the Board of Agriculture of Massachusetts, states that the stomachs of four small chickadees contained 1,028 eggs of the canker worm; the stomachs of four others had about 600 eggs and 105 female moths of the canker worm in them. It was estimated that one chickadee feeding for 25 days would destroy some 138,750 eggs of this noxious worm, a phenomenal amount for so small a bird. Professor Forbes (Director of the Illinois State Laboratory of Natural History) found in the stomach of a single robin 175 of bibis (a fly), which in the larvæ stage feeds on the roots of grass. From a few facts of this nature we can see

what an economic factor the birds are, flitting about our farms and orchards by day and night. Hawks and owls especially, that are usually so condemned by the farmer and sportsmen in general, are constantly protecting the crops by killing off thousands of small rodents so destructive to grain and trees, and also by consuming millions of grasshoppers in the fall of the year; in fact, many species of hawks prey wholly on grasshoppers. As time rolls on and vast stretches of land come under cultivation we shall see the need of giving more attention to the study and protection of bird life, as the birds seek homes about our premises to raise their broods and render a valuable service in keeping in check millions of noxious insect pests. It is stated as a fact by one of the leading entomologists of the United States that insects alone cause an annual loss of at least 200,000,000 dollars to the agricultural interests of this country.—W. D. EMERSON, in *California Fruitgrower*.

Bulk Shipment of Wheat.

As a result of the investigations of the South Australian Royal Commission on the marketing of wheat the Agricultural Department of New South Wales made inquiries from the Agent-General of that State as to the advantages likely to be obtained by shipping grain to the United Kingdom in bulk. Mr. Coghlan has reported as follows:—"All the English ports to which foreign wheat is shipped receive it in bulk and in bags, about 60 per cent. of the wheat imported being in bulk and 40 per cent. in bags. In London, Bristol, Glasgow, Liverpool, and Manchester the larger proportion is received in bulk, while at Hull the proportions are about equal. At all the principal docks where wheat is imported, except Hull, there are elevators, which enable the wheat arriving in bulk to be discharged from the ships with greater rapidity and less expense than the grain imported in bags. At Hull the wheat arriving in bulk is discharged into lighters and carried to the mills, of which the greater number are so situated that railway transit is not required. On the other hand, the railways possess practically no facilities for handling grain in bulk, and *wheat which requires railway transport has to be bagged at the port*. The dockowners provide up-to-date machinery at the docks for this purpose, the cost of which has to be borne by the merchant. In some cases, when wheat arrives in bags, these are not strong enough to bear railway transit, and the wheat has to be rebagged. The quantities of imported wheat handled by the railway is, however, comparatively small. Shipowners prefer that wheat should be sent in bulk, as there is economy of space, the discharge is more rapid, and is paid for by the merchant. The cost of freight is lessened by shipping in bulk, as the bags are paid for on the other system. The merchants prefer the system of shipping in bags. Their chief reason appears to be that the wheat in bags is weighed in small lots of about 4 bush., and on each occasion

the merchant gets the benefit of the draft required to turn the scales, whereas bulk wheat is weighed in lots of one ton or more. They regard the slower rate of discharge from the ship as an advantage, as it gives them more time to dispose of the grain. In the port of London the cost of discharging wheat in bags is paid by the ship. Factors in Mark Lane believe that Australian wheat in bulk would not command quite so high a price as in bags, and some corn merchants consider there is some danger that the condition of the wheat would be adversely affected by transport in bulk, that there would be more danger from attack by weevils, and that the wheat would be more likely to suffer from natural heating. The damage done to wheat in bags from these causes is more confined, and can be located more easily. Messrs. Berry, Barclay, & Co., a firm of London merchants interested in the Australian grain trade, believe that the extra sea risks, if it were handled in bulk, would enhance the rate of insurance. Some of these objections must be considered more or less fanciful, seeing that Argentine wheat, which has somewhat similar characteristics to Australian, is brought here in large and increasing quantities in bulk, and I can find no complaints in regard to the manner in which it is handled. On the whole there appears to be a saving of about 2s. per ton in this market in bulk shipments, but I should be disposed to say that otherwise there is little to choose between the two systems."

Frozen Meat for Lancashire.

In an article entitled "Manchester, a Market for Australian Produce," appearing in the *Victorian Journal of Agriculture*, the State Immigration Officer writes—"Even under the present unsatisfactory conditions Lancashire is said to be the largest consuming county in the United Kingdom for Australian mutton. Experts have informed me that Australian carcasses, which are small and lean, are peculiarly popular among the working classes. Since the introduction of the frozen meat trade the Argentine producers have, with great keenness, studied the tastes of the operatives in the Lancashire and Yorkshire mills; consequently Argentine mutton sells at a better price than Australian. My informants are, however, of the opinion that if the Australian producers studied the requirements with equal care, and arranged direct shipments, the Australian mutton would command better prices. The factory operatives do not desire fat meat. New Zealand mutton is considered too fat, too large, and too dear for the working classes. That from the Argentine and Australia is considered more suitable, and the South American mutton, though similar in character to the Australian, is most in demand, because it looks brighter and is of better appearance." The above bears out the oft-repeated arguments of Major Norton (Trade Commissioner in Great Britain for South Australia) in favor of shipments of produce to the outports of Great Britain.

The World's Wheat Production.

The Statistician of New South Wales has published the following figures, showing the production of wheat since 1900 in the 15 principal wheat-producing countries of the world. It will be observed what rapid progress Canada has made in this respect since the beginning of the century, moving up from fifteenth place to fifth place on the list. Asiatic Russia has also risen steadily.

1900-01.	Million Bushels.	1905-06.	Million Bushels.	1908-09.	Million Bushels.
United States	.. 544	United States	.. 672	United States	.. 715
Russia (Europe)	.. 312	Russia (Europe)	.. 551	Russia (Europe)	.. 474
France	.. 296	France	.. 325	France	.. 345
India	.. 184	India	.. 274	India	.. 274
Germany	.. 156	Italy	.. 155½	Canada	.. 161
Hungary	.. 144	Hungary	.. 152	Italy	.. 159
Italy	.. 116	Argentina	.. 146	Argentina	.. 157
Spain	.. 102	Germany	.. 131	Spain	.. 139
Argentina	.. 72	Canada	.. 105	Germany	.. 134
Turkey	.. 56	Roumania	.. 100	Hungary	.. 109
Australia	.. 55	Spain	.. 89	Russia (Asia)	.. 75
United Kingdom	.. 54½	Australia	.. 77	Australia	.. 68
Roumania	.. 54	Russia (Asia)	.. 65	United Kingdom	.. 63
Russia (Asia)	.. 48	United Kingdom	.. 60	Austria	.. 57
Canada	.. 48	Austria	.. 52	Roumania	.. 56

The Latest Argentine Crop.

"Mr. Bela Csitary (Professor of Agriculture in Hungary), who returned quite recently from a long trip in the Argentine, where he spent over five months with a view of studying farming conditions, gives in one of our Continental contemporaries a highly interesting account of his impressions on the last Argentine crop," says *Broomhall's Corn Trade News* of February 14th. "After referring to the evil, that owing to the lack of a reliable and trustworthy official organisation, the trade in Europe is exposed to the interested reports of large firms, he gives a few facts, which show undoubtedly that the Plate crop turned out far below early expectations. The chief cause of this failure is the unprecedentedly long drought. Famine put in its appearance in the northern and eastern parts of Bahia Blanca region, in Las Pampas, Entre Rios, and Santa Fé. Peasants cried out for help from the Government and strong measures had to be taken by the latter to keep down a revolt. Along the railways one can see the dead unburied bodies of thousands of cattle. The railway companies and large corn merchants' firms, who looked forward to a busy season, are discharging a number of their employes. The crops are satisfactory only in some parts of the province of Buenos Aires, Córdoba in the southern corner of Santa Fé, and a few districts of Entre Rios. Mr. Csitary would not be surprised if this year's exportation fell behind that of 1910."

Blue Weed.

A great deal of discussion took place last year both in and out of Parliament as to the desirability of proclaiming blue weed (*Echium plantagineum*) a noxious weed. The same question is now being debated in New South Wales, where the plant first escaped from gardens, and where it is generally called "Patterson's curse." The *Farmer and Settler* says—"At the monthly meeting of the Kyeamba (Wagga) Shire Council a sheaf of letters was read from the landholders calling attention to the need for taking action to prevent the spread of the plant known as Patterson's curse. Mr. McMicking wrote that it is already proclaimed a noxious weed in the shires of Coores and Tumbarumba, and by the Albury Municipal Council; but he thought it would be impossible to take that course in the Hume Shire, as it had obtained such a hold that eradication might have a very serious consequence. It was decided to take steps to have the plant declared a noxious weed, and to ask neighboring shires to co-operate in the movement."

Imports and Exports of Fruits.

During the month of March 5,795bush. of fresh fruits, 2,174 bags of potatoes, 91 bags of onions, and 42pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 238bush. of bananas (chiefly overripe) were destroyed. At Serviceton 84bush. of fresh fruits were also admitted. The exports to inter-State markets examined and passed at Adelaide and Port Adelaide comprised 10,608bush. of fresh fruits, 3,140pkgs. of vegetables, and 9pkgs. of plants. In addition, 253bush. of fresh fruits were certified for export at Gawler, 51bush. at Stirling North, 40 bags of potatoes and 2bush. of fresh fruits at Coonawarra, and 307bush. of fresh fruits at Wirrabara. Under the Federal Commerce Act 34,762 cases of fresh fruits, 2,816pkgs. of dried fruits, 30pkgs. of preserved fruits, and 300pkgs. of honey were exported to oversea markets during the same period. These were distributed as follows:—For London, 15,052 cases apples, 2,843 pears, and 2 cases peaches, 2,741pkgs. dried fruits, 4pkgs. preserved fruit, and 300pkgs. honey; for Germany, 12,981pkgs. of apples and 970 pkgs. pears; for New Zealand, 1,151pkgs. of grapes and 75pkgs. dried fruits; for India and East, 1,615pkgs. apples, 6pkgs. pears, 139pkgs. grapes, and 26pkgs. of preserved fruit. Under the Federal Quarantine Act 1,188pkgs. of plants, seeds, bulbs, &c., were admitted from oversea sources.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

CONCRETE FENCING POSTS.

"J. W. Y."—Mr. W. G. Auld informs us that at Messrs. Penfold & Co.'s vineyard, Magill, telephone posts 20ft. high, 2½in. at top, and 6in. at bottom, have been made of concrete, and have proved very successful. The original article, which appeared in the *Journal of Agriculture* for June, 1909, gave the result of experiments made in New South Wales after an American model, and explained the method fully, with illustrations. The ordinary posts are 6ft. 3in. long by 3½in. by 3in. at top, and 5½in. by 5in. at base. The strainers are 7ft. 9in. long, with a cross section of 8in. by 6in. The materials are—Cement, 1 part; sand, 2½; gravel, 5; with four pieces of No. 6 wire placed lin. from the corner of each post as reinforcement.

SALINE WATER FOR GARDENS.

"E. S. M.", Angaston, writes that the water that he is using in the garden is pumped from the Gawler River into a large receiving tank, and is thence distributed. He finds, as the summer progresses, that a deposit of some soluble substance is left by the water on the surface of the ground, and he wishes to know if there is any chemical which might be placed in the receiving tank, or any fertiliser which could be used upon the soil to counteract the deposit.

The Government Analyst (Mr. W. A. Hargreaves), to whom the question was referred, said attempts at neutralising the salts would be waste of time until their identity is established by chemical analysis. Very little information could be gained from ordinary observation by means of experimenting on the water and the ground, even in 12 months, and possibly at the end of that time materials and labor would have been wasted to a greater value than the cost of analysis, which would be about three guineas. With an exact knowledge of the contents of the water it might be possible to suggest a simple means of counteracting the injurious salts. The end of March or the beginning of April would find the springs at their lowest volume and the

proportion of dissolved salts at their maximum. For the purpose of taking samples a number of bottles should be obtained with a total capacity of at least half a gallon. These should be washed out and rinsed several times with hot water before standing them upside down to drain. After filling they should be stoppered with new corks soaked and washed in hot rain-water.

TICK IN POULTRY.

"Poultry-breeder," Wallaroo, writes asking information to enable him to eradicate poultry ticks.

The Poultry Expert (Mr. D. F. Laurie) replies—"Use galvanized iron poultry-houses, with as little woodwork as possible. Pull down and burn the material of old fowlhouses, nest boxes, &c. Paling fences which cannot conveniently be replaced should be treated with strong kerosine emulsion applied hot (kerosine 1 part, boiling soapsuds 10 parts). Affected fowls may be dipped in the above solution at blood heat. Keep the head clear and hold the bird in the emulsion until the feathers are saturated. All perches should be treated with kerosine and oil equal parts, and the hot emulsion poured into all cracks and crevices."

MILDEW AND WOOLLY APHIS.

"E. H. S." explains that the terminal twigs of his apple trees are covered with a white mildewy substance, and the leaves, on being handled, crumble away and give off a fungoid odor. His apple trees are also badly attacked with woolly aphis.

The Horticultural Instructor (Mr. G. Quinn) replies—"From the description I am inclined to think the trees are suffering from powdery mildew of the apple (*Podosphaera Kunzei*), which is very troublesome to some varieties in moist climates. The remedy is Bordeaux mixture applied before the disease appears. A strength of 1lb. of bluestone and one of lime to 15galls. of water should be ample when the tree is in full foliage. For woolly aphis red oil emulsion has proved a valuable remedy. It is made by emulsifying the red oil with soap after the manner of kerosine emulsion, but it is not safe to use upon evergreen trees, and should only be sprayed on deciduous trees, such as the apple, when they are without foliage."

WARTS ON FOWLS.

"Disease," Mount Gambier, asks for a cure for warts on fowls.

The Poultry Expert (Mr. D. F. Laurie) replies—"This disease is chicken-pox. Isolate all affected fowls and treat as follows:—Apply equal parts of vinegar and warm water to the pustules, wipe dry and then apply carbolised glycerine (one part carbolic acid, 15 parts glycerine) daily. Give in the soft food Epsom salts, one packet to each 20 adults once a week."

MANURES FOR FRUIT TREES.

"N. R.," Stirling North, writes that his apricot and peach trees are not giving profitable returns, and asked what manure to apply to them; also to fig trees.

The Horticultural Instructor (Mr. G. Quinn) replies—"Try 3lbs. of superphosphate, $\frac{3}{4}$ lb. sulphate of ammonia, and 1lb. sulphate of potash to each tree of mature size. These manures can be mixed and made to cover a radius of 3ft. or 4ft. beyond the spread of the foliage. June or July is a good time to apply, and the ground should receive a good tillage. Such a dressing should cost about 6d. per tree. In most localities it is found that the only way to secure reasonable crops from Red May and other early peaches is to thin the top of the tree after the fruit is taken off in summer and not prune again until the fruit shoots in the following spring. This pruning usually consists in cutting away barren shoots which bear no fruit. For fig trees authorities recommend 1lb. of superphosphate, 2lbs. of bonedust, and 1lb. of sulphate of potash per tree, applied in time to receive most of the winter's rain. For a peach as fertile as Red May, and a better cropper, I would suggest Sneed and Triumph. The former is not quite so good a peach as Red May, but a better and earlier cropper. The Triumph is a yellow-fleshed variety, a thriving tree and regular brearer. Out of 400 varieties of peach which we are growing in the Government orchard at Blackwood, we are hopeful of finding some good kinds to fill the gaps in our present periods of ripening."

SCAB ON POTATOES.

"P. H. K.," Clare, forwards samples of potatoes with rough scablike pustules on the skin.

The Horticultural Instructor (Mr. G. Quinn) replies—"The potatoes are affected by scab, but not necessarily by the fungus called *Oospora scabies*. Potatoes grown in rich, raw, peaty, or possibly in swampy land are often affected in this manner. It has been attributed to the presence of some substance or compound in the soil and not to irritation set up by any insect, fungus, or other organism. It is in no way connected with the fungus which causes Irish blight, and usually disappears as the ground sweetens with draining."

EXPORT PEARS.

"J. M. M.," Mount Gambier, asks for information about planting pears for export, naming several varieties.

The Horticultural Instructor (Mr. G. Quinn) replies—"Doyenne du Comice has not been grown largely here, but I have seen and sampled splendid fruits on the Huon River, Tasmania. English garden authorities speak of it as the best flavored of all pears, and a very healthy tree. We have no local data yet as to periods of ripening. In the *Journal of Agriculture* of Victoria, January, 1911, Mr. Pescott, Principal of the Horticultural School at Burnley,

gives the dates of flowering of about 3 doz. varieties of pear during the years 1905, 1908, and 1910, showing that the only first-class export pear blooming with the Winter Nelis is the Beurré Diel, although Mr. Pascoe's list shows Josephine de Malines to bloom both earlier and later than Winter Nelis in different seasons. I would suggest planting your pears so that not more than two rows of any variety are adjoining each other. Your suggested selection of Doyenne du Comice, Joséphine de Malines, Glou Moreau, Winter Nelis, Beurré Bosc, and Vicar of Winkfield is, in my opinion, correct. Beurré Capiaumont has not been proved a success for export yet. Beurré Clairgeau and Beurré Diel are among the best. With regard to the Vicar of Winkfield we have been shipping this pear from South Australia for 13 or 14 years, and although it only brings about 10s. 6d. to 12s. 6d. per case it pays well, because the fruits carry as safely as apples, and the quantity packed in the export case is only worth about 1s. 6d. when it leaves here. The tree is an excellent bearer after it gets past the excessively vigorous stage of the first eight or ten years."

FRUIT-PRESERVING WITHOUT BOILING.

"J. P.," North Adelaide, asks whether there is any method of preserving fruits and vegetables for food without boiling them.

The Horticultural Instructor (Mr. G. Quinn) replies—"No method is known whereby fruit can be preserved in a wholesome condition without being sterilised by means of heat. All chemicals which have been found to preserve fruit or vegetables from decay are injurious to human health, because if not in sufficient quantity to be actually poisonous they destroy the ferments which play an important part in the process of digestion. As a middle course you may adopt what is termed 'continuous sterilisation.' This consists in placing the fruit in water or the vegetables in weak brine in preserving jars which are screwed down tightly. These are then placed in the boiler and the temperature is brought up to not more than 160 F., and then allowed to cool off. Repeat this the next day, and again on the third day, seeing that the tops are very firmly screwed or clamped down upon the rubber rings. Such fruit or vegetables will keep, and their texture is not changed as it is by boiling. A thermometer for this work would cost about 3s. 6d., and should be inserted between the jars in the boiler, so as to ascertain the correct temperature."

MATING OF LEGHORNS.

"Novice," Burnside, asks how many hens should be mated with a vigorous Leghorn cockerel.

The Poultry Expert (Mr. D. F. Laurie) replies—"If at liberty, 20 to 30 hens may be given him, but if in confinement from 15 to 20 hens."

THE PROBLEM OF "BARE PATCHES."

UNPRODUCTIVE SOILS ANALYSED.

By W. A. HARGREAVES, M.A., F.I.C., Government Analyst and Chief
Agricultural Chemist.

Bare patches are infertile portions of soil, sometimes of considerable area, situated in land of ordinary fertility. They are noticeable in paddocks by the fact that while grass grows all round them, it seems unable to thrive on the portion which is left bare. The Acting Secretary to the Minister of Agriculture (Mr. Summers) drew the attention of the Hon. the Minister to the subject early in 1910. In pursuance of instructions, arrangements were made in this laboratory to make analyses and tests with the object of determining, if possible, the cause of the sterility of these patches and suggesting a remedy.

The first lot of samples was received in June from Walloway, and at later times others were received from Carrieton, Oladdie, Amyton, Redhill, Balaklava, and Mount Bryan. In each case a sample of soil was taken from the centre of each patch and marked 1A. A corresponding sample of subsoil was marked 1B.

A sample of soil was taken from the edge of each bare patch and marked 2A, while the subsoil was marked 2B. For comparison a sample was taken in each case of the soil outside the bare area, at a place where vegetation grows well. This was marked 3A, and the subsoil at the same position was marked 3B. In the accompanying tables setting out the results of the analyses the figures and letters at the head of the columns denote: A = soil, B = subsoil, 1 = centre of bare patch, 2 = edge of bare patch, 3 = adjacent fertile land. In the case of the samples from Walloway, samples of soil and subsoil were taken from the centre of a second bare patch and these are marked 4A and 4B respectively. Each sample of soil represents a depth of 6in. from the surface, while each subsoil sample is taken from the earth below the soil to a depth of 12in. The "pot test" was conducted in each case by filling the soil being tested into an ordinary 3in. flower-pot. Five wheat seeds

were planted, and the soil was kept at the proper condition of moisture so that no water drained away to reduce the amount of soluble salts in the sample of soil. At the end of six weeks from the time of planting the crop was cut close to the surface of the soil and immediately weighed. The weight is shown in the table expressed in milligrams. With respect to the analyses I offer the following comments :—

1.—WALLOWAY.

The soil from the centre of the bare patch 1A is well supplied with nitrogen, phosphoric acid, and potash, but it is low in lime, though not much worse in this respect than the sample of soil taken outside the bare patch and where vegetation grows well. It differs markedly from the good soil by having a much higher quantity of soluble salts, consisting principally of common salt, magnesium chloride, and calcium chloride. There is no doubt that the infertility is due to the presence of this large quantity of soluble salts.

The pot test is interesting in that no growth was obtained with the bare patch soil. The subsoil gave some growth, while the good soil produced a very fair growth, although the soluble salts amounted to .04 per cent., and the second bare patch yielded a growth of 175 milligrams, although it contained more soluble salts. To test the conclusion formed respecting the cause of the sterility of the soil, a sample of the bare patch soil was leached with water to remove as much of the soluble salts as possible. A pot test was made with the washed earth. Five berries of wheat produced a crop of 572 milligrams weight, which compares fairly well with the 715 milligrams given by the good soil. The subsoil 1B, similarly treated, gave a crop weighing 397 milligrams, as against 292 milligrams given by the untreated subsoil. As the analysis indicated a shortage of lime, another test was made with the washed soil from the bare patch. Some lime was added and five wheat berries planted. The yield this time was 702 milligrams, which is equal to the product from the good soil.

The second bare patch at Walloway carries more soluble salts than the soil already dealt with (1A). Nevertheless the pot test shows that it is not so sterile, as it yielded a crop of 175 milligrams. This may be due to the fact that it is a loam, whereas the first patch is a clay. A washed sample of the soil gave a crop of 533 milligrams, while a washed and limed sample gave 604 milligrams weight of growth. In both patches the subsoils are better than the soils, and gave better growth in the pot experiments.

The conclusion formed from these tests is, as in the case of the first patch, that the infertility is due to the excessive quantity of soluble salts contained in the soil. The analysis indicates that the salt present in largest amount is common salt, but a large quantity of calcium chloride is also present. The analytical calculation indicating calcium chloride was confirmed to some extent by the fact that the sample was moist, and could not be dried by exposure to air.

Soils from Walloway.

First Bare Patch.

Classification.	1a.	1b.	2a.	2b.	3a.	3b.
	Red Clay Faintly alkaline	Red Clay. Faintly alkaline	Red Clay Faintly alkaline	Red Clay Faintly alkaline	Red Clay Loam. Faintly alkaline	Red Clay. Faintly alkaline
Reaction of soil to litmus . . .						
Percentage of fine earth	94.75	95.25	92.50	97.00	97.00	98.00
Nitrogen in air-dried fine earth . . .	0.102	0.097	0.133	0.095	0.154	0.122
Phosphoric acid in air-dried fine earth	0.060	0.075	0.065	0.068	0.060	0.070
Lime in air-dried fine earth	0.455	0.704	0.731	0.690	0.649	0.704
Potash in air-dried fine earth	0.703	0.650	0.476	0.520	0.604	0.586
Manganese as Mn ₃ O ₄ in air- dried fine earth	trace	nil	trace	nil	trace	trace
Total soluble salts (dried at 150° C.)	1.188	1.090	0.062	0.053	0.038	0.040
Assumed composition of soluble salts—						
Calcium carbonate	0.012	0.023	0.020	0.020	—	—
Calcium sulphate	0.074	0.082	nil	0.003	—	—
Calcium chloride	0.086	nil	nil	nil	—	—
Magnesium carbonate	nil	nil	0.006	0.012	—	—
Magnesium sulphate	nil	0.069	nil	nil	—	—
Magnesium chloride	0.223	0.114	0.004	nil	—	—
Sodium carbonate	nil	nil	nil	nil	—	—
Sodium sulphate	nil	nil	nil	nil	—	—
Sodium chloride	0.697	0.767	0.007	0.010	—	—
<i>Pot Test</i> (five seeds planted)—						
Weight in milligrammes of crop six weeks after planting	nil	292	747	669	715	598

Soils from Walloway.

Second Bare Patch.

Classification	4a.	4b.
	Loam. Alkaline	Loam. Alkaline
Reaction of soil to litmus		
Percentage of fine earth	91.00	92.00
Nitrogen in air-dried fine earth	0.123	0.113
Phosphoric acid in air-dried fine earth	0.132	0.110
Lime in air-dried fine earth	2.750	3.240
Potash in air-dried fine earth	0.648	0.524
Manganese as Mn ₃ O ₄ in air-dried fine earth	0.080	trace
Total soluble salts (dried at 150° C.)	2.710	1.560
Assumed composition of soluble salts—		
Calcium carbonate	0.020	0.027
Calcium sulphate	0.062	0.081
Calcium chloride	0.441	0.083
Magnesium carbonate	nil	0.125
Magnesium sulphate	nil	nil
Magnesium chloride	0.192	nil
Sodium carbonate	nil	nil
Sodium sulphate	nil	nil
Sodium chloride	1.523	1.105
<i>Pot Test</i> (five seeds planted)—		
Weight in milligrammes of crop six weeks after planting	175	455

2. CARRIETON.

In this case the soil from the bare patch is well supplied with the usual plant foods—nitrogen, phosphoric acid, potash, and lime; and the only thing shown by the analyses is that the amount of total soluble salts in the soil is somewhat greater than that of the neighboring fertile soil.

The difference is shown in the pot test, where a weight of 1,183 milligrams was reaped from the fertile part, and only 683 milligrams from the bare patch. The latter result is not a very poor one, although the quantity of soluble salts (0.528 per cent.) is near the limit of tolerance for wheat. The amount of soluble salts in this patch would probably vary from season to season, and at times the percentage of salt may be above the limit of tolerance when plant growth would be checked. This conclusion is confirmed by Mr. Bock's report that wheat will only grow in the wet season on these patches.

Soils from Carrieton.

Classification.	1A.	1B.	2A.	2B.	3A.	3B.
	Limestone Loam	Limestone.	Limestone Clay Loam	Limestone	Limestone Clay Loam.	Limestone Loam.
Reaction of soil to litmus ...	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline
Percentage of fine earth	92.00	91.00	88.00	76.50	76.50	60.00
Nitrogen in air-dried fine earth	0.134	0.116	0.145	0.129	0.137	0.113
Phosphoric acid in air-dried fine earth	0.100	0.115	0.102	0.097	0.072	0.102
Lime in air-dried fine earth ...	3.580	9.900	4.130	7.770	2.490	10.800
Potash in air-dried fine earth..	0.796	0.864	0.879	0.635	0.408	0.920
Manganese as Mn3O4 in air-dried fine earth	nil	nil	nil	nil	nil	nil
Total soluble salts (dried at 150° C.)	0.528	0.434	0.104	0.164	0.148	0.189
Assumed composition of soluble salts—						
Calcium carbonate	0.015	0.018	—	0.027	0.027	0.027
Calcium sulphate	0.020	0.025	—	0.034	0.035	0.049
Calcium chloride	0.065	0.048	—	nil	0.007	nil
Magnesium carbonate ...	nil	nil	—	nil	nil	nil
Magnesium sulphate ...	nil	nil	—	0.008	nil	0.005
Magnesium chloride	0.038	0.040	—	0.011	0.021	0.001
Sodium carbonate	nil	nil	—	nil	nil	nil
Sodium sulphate	nil	nil	—	nil	nil	nil
Sodium chloride.....	0.264	0.216	—	0.041	0.011	0.063
<i>Pot Test</i> (five seeds planted)—						
Weight in milligrammes of crop six weeks after planting	683	611	683	878	1,183	767

3. OLADDIE.

In the case of the sample of soil from the bare patch at Oladdie the analysis does not disclose any reason accounting for the sterility. The amount of

soluble salts is not excessive, and the soil is well supplied with potash and phosphoric acid. Although the nitrogen and lime are low in quantity, they are as high as in the surrounding fertile soils.

Manganese salts when in excess prevent plant growth, but unless the quantity exceeds .03 per cent., they are not regarded as dangerous. In this case the manganese (.03 per cent., estimated as $MnSO_4$) is less than in the soil from the edge of the patch, where some growth takes place. The explanation may perhaps be that in a normal condition this soil is rich in soluble salts, but at the time the sample was taken most of the salts had been washed down by rain. In support of this conjecture it should be noted that when the sample arrived at the laboratory it was saturated with water.

Since writing the foregoing, I have noted Mr. Chalmers's statement respecting the bare patches at Oladdie, in which he says that these patches are getting smaller every year since better (*i.e.*, wetter) seasons have been experienced.

Soils from Oladdie.

Classification.	1A.	1B.	2A.	2B.	3A.	3B.
	Red-brown Clay.	Dark-red Clay.	Red-brown Clay Loam.	Dark-red Clay.	Brown Clay Loam.	Dark-red Clay.
Reaction of soil to litmus . . .	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline
Percentage of fine earth	92.70	91.50	92.50	84.70	93.50	89.50
Nitrogen in air-dried fine earth . . .	0.066	0.056	0.067	0.060	0.068	0.015
Phosphoric acid in air-dried fine earth . . .	0.062	0.095	0.060	0.082	0.067	0.062
Lime in air-dried fine earth . . .	0.350	0.830	0.420	1.380	0.360	0.490
Potash in air-dried fine earth . . .	0.730	0.908	0.806	0.978	0.705	0.864
Manganese as $MnSO_4$ in air-dried fine earth	0.030	0.030	0.040	0.070	0.020	0.030
Total soluble salts (dried at 150° C.)	0.058	0.181	0.016	0.085	0.009	0.014
<i>Pot Test</i> (five seeds planted)— Weight in milligrammes of cropsix weeks after planting	475	416	565	637	312	448

4. AMYTON.

(No. 1 Sample.)

The bare patches at Amyton are represented by two samples—one a clay and the other a clay loam. The clay is abundantly supplied with potash, and although the quantities of nitrogen and lime are less than desirable in a good soil, they are not so small as to indicate the cause of sterility; in fact, many soils in South Australia give good crops with smaller quantities of these ingredients. The amounts of manganese and soluble salts, however, are both high, and are sufficient to injuriously affect plant growth. This fact does not quite explain the cause of the sterility of

this soil, as the sample taken from the edge of the bare patch (2a), where some growth takes place, contains somewhat larger quantities of manganese and soluble salts. As against this it should be noted that the latter soil is otherwise of a richer character than from the bare patch. The pot test shows the difference in the fertility, the bare patch soil yielding a crop weighing 357 milligrams, while that at the edge gave 884 milligrams.

Soils from Amyton.

No. 1 Sample.

Classification.	1a.	1b.	2a.	2b.	3a.	3b.
	Clay	Clay.	Clay.	Clay	Clay Loam.	Clay.
Reaction of soil to litmus ...	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline
Percentage of fine earth	98-00	98-00	99-00	99-50	99-50	98-50
Nitrogen in air-dried fine earth	0-066	0-070	0-062	0-062	0-068	0-063
Phosphoric acid in air-dried fine earth	0-057	0-060	0-062	0-062	0-055	0-070
Lime in air-dried fine earth ..	0-400	0-380	0-950	0-890	0-400	1-710
Potash in air-dried fine earth.	0-823	0-831	0-914	0-932	0-627	0-879
Manganese as Mn ₃ O ₄ in air-dried fine earth	0-050	0-040	0-070	0-060	0-040	0-020
Total soluble salts (dried at 150° C.).....	0-744	0-162	0-838	0-347	0-114	0-167
Assumed composition of the soluble salts—						
Calcium carbonate	0-015	0-010	0-022	0-015	0-018	0-007
Calcium sulphate	0-049	nil	0-049	nil	nil	nil
Calcium chloride	0-038	nil	0-019	nil	nil	nil
Magnesium carbonate ...	nil	0-007	nil	0-013	nil	0-008
Magnesium sulphate	nil	0-003	nil	0-020	0-019	nil
Magnesium chloride	0-078	nil	0-073	nil	nil	nil
Sodium carbonate	nil	nil	nil	nil	nil	0-015
Sodium sulphate	nil	0-029	nil	0-012	0-012	0-023
Sodium chloride	0-352	0-083	0-485	0-199	0-045	0-061
<i>Pot Test</i> (five seeds planted)—						
Weight in milligrammes of crop six weeks after planting	357	702	884	708	728	565

5. AMYTON.

(No. 2 Sample.)

The clay loam, representing the second kind of bare patch at Amyton, is in many respects similar to the clay first referred to, although it contains more lime and has very much less manganese. It has, however, a high percentage of soluble salts, consisting principally of common salt, and this is sufficient to account for the unproductiveness of this soil. The bare patches are called in this district "salty patches," for a white efflorescence of salt is seen on the patches at times. In the pot test the neighboring good soil

gave 761 milligrams weight, while the bare patch sample gave only 390 milligrams weight, and the plant growth itself was weak and of a yellow color.

Soils from Amyton.

No. 2 Sample.

Classification.	1A.	1B.	2A.	2B.	3A.	3B.
	Clay Loam	Clay, Limestone	Clay Loam	Clay, Limestone.	Clay.	Clay, Limestone.
Reaction of soil to litmus ...	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline
Percentage of fine earth	94.50	92.50	94.00	94.00	93.00	93.00
Nitrogen in air-dried fine earth.	0.066	0.043	0.072	0.046	0.062	0.054
Phosphoric acid in air-dried fine earth	0.040	0.085	0.060	0.092	0.050	0.112
Lime in air-dried fine earth ..	1.260	8.260	1.640	12.460	1.330	11.200
Potash in air-dried fine earth.	0.245	0.508	0.639	0.514	0.543	0.507
Manganese as Mn3O4 in air-dried earth	0.020	trace	0.090	nil	0.060	0.190
Total soluble salts (dried at 150° C.)	1.148	1.740	0.156	0.810	0.129	0.156
Assumed composition of the soluble salts—						
Calcium carbonate	0.018	0.022	0.008	0.027	0.012	0.010
Calcium sulphate	0.165	0.292	nil	0.031	nil	nil
Calcium chloride	0.006	nil	nil	nil	nil	nil
Magnesium carbonate ...	nil	nil	0.010	nil	0.014	0.014
Magnesium sulphate	nil	0.081	nil	0.064	nil	nil
Magnesium chloride	0.066	0.038	nil	nil	nil	nil
Sodium carbonate	nil	nil	0.018	nil	0.002	0.019
Sodium sulphate	nil	nil	0.025	0.075	0.026	0.026
Sodium chloride	0.782	1.201	0.076	0.554	0.061	0.071
<i>Pot Test</i> (five seeds planted)—						
Weight in milligrammes of crop six weeks after planting	390	494	683	338	761	696

NOTE.—In the pot tests the plants were of yellow color, and the growth was not strong.

6. REDHILL.

Except for the high amounts of manganese and soluble salts the sample of clay, representing the bare patches at Redhill, would be classed as a good soil. It is certainly somewhat deficient in lime, but not to the extent of making the soil unproductive. The quantity of manganese is just about the limit which may be present without checking growth, but in my opinion it is not sufficient to cause sterility. The very high percentage of soluble salts (2.720 per cent.), consisting principally of common salt and magnesium sulphate, is sufficient to account for the sterile condition of this soil. In the pot tests no growth whatever was obtained, while four wheat berries planted in the neighboring good soil gave 1,222 milligrams of strong plant growth. This is equivalent to 1,527 milligrams of crop from five wheat seeds. With the intermediate soil five seeds gave 1,424 milligrams of growth.

Soils from Redhill.

Classification.	1A.	1B.	2A.	2B.	3A.	3B.
	Clay.	Clay with Limestone Pebbles.	Loam.	Clay with Limestone Pebbles.	Clay Loam.	Clay Loam with Limestone Pebbles.
Reaction of soil to litmus ...	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline
Percentage of fine earth	98.50	81.50	99.00	96.00	98.50	96.00
Nitrogen in air-dried fine earth.	0.074	0.038	0.095	0.060	0.130	0.099
Phosphoric acid in air-dried fine earth	0.055	0.057	0.032	0.052	0.045	0.062
Lime in air-dried fine earth ..	0.518	0.910	0.280	0.840	0.700	2.520
Potash in air-dried fine earth.	1.182	1.374	0.398	1.477	0.732	1.038
Manganese as Mn3O4 in air-dried fine earth	0.060	0.060	0.020	0.040	0.030	0.020
Total soluble salts (dried at 150° C.).....	2.720	2.680	0.127	0.688	0.070	0.128
Assumed composition of the soluble salts—						
Calcium carbonate	0.015	0.027	0.006	0.007	0.007	0.022
Calcium sulphate	0.255	0.049	0.005	nil	nil	nil
Calcium chloride	nil	nil	nil	nil	nil	nil
Magnesium carbonate ...	nil	nil	nil	0.003	0.007	0.004
Magnesium sulphate	0.394	0.251	0.007	nil	nil	nil
Magnesium chloride	nil	nil	nil	nil	nil	nil
Sodium carbonate	nil	nil	nil	0.055	0.017	0.003
Sodium sulphate	0.168	0.012	0.002	0.179	0.011	0.014
Sodium chloride	1.700	2.130	0.074	0.408	0.018	0.071
Pot Test (five seeds planted)—						
Weight of crop in milligrammes six weeks after planting	nil	nil	1,424	559	1,222	1,547

NOTE.—In 3A pot test only four seeds germinated, so that $1,222 \times \frac{1}{4} = 1,527$ mgms, i.e., about the same as the corresponding subsoil.

7. BALAKLAVA.

The light loam soil from Balaklava, which has been found to be unproductive, is poor in phosphoric acid, lime, and nitrogen, but it is, except for lime, as well equipped as the neighboring clay loam which is productive. The analysis discloses the fact that the total amount of soluble salts is near to the limit of tolerance which wheat shows for these salts, and possibly at certain times the percentage of the salts may increase so as to render the soil comparatively sterile. The pot tests indicate that the soil analysed was not so barren as some of those representing bare patches in other districts, but the test shows that it is not so productive as the clay loam from the same vicinity. It is more than probable that the unproductive nature of these patches is due more to the physical character of the soil than to the presence of soluble salts.

Mr. Wagner's report says that these patches are all right so long as they do not get too much rain after they are worked. A couple of inches of rain will wet them down as hard as if they had never been worked. The surface cakes hard and causes subsequent rains to run off, and the young wheat plant is unable to break through the hard layer unless further rain comes at the right time. Mr. Wagner states, "I have seen wheat for a long time under the crust growing round and round under the crust and perish if rain kept away too long." Some means of bringing these patches to a proper state of tilth would probably make them productive without any other treatment. It is just possible that by bringing up a fair proportion of the subsoil this end may be achieved.

Soils from Balaklava.

Classification.	1A.	1B.	2A.	2B.	3A.	3B.
	Light Loam.	Clay with a little Limestone	Light Clay.	Clay.	Clay Loam	Clay.
Reaction of soil to litmus ...	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline
Percentage of fine earth	99.00	98.50	98.50	98.50	98.50	97.50
Nitrogen in air-dried fine earth	0.068	0.063	0.071	0.061	0.079	0.063
Phosphoric acid in air-dried fine earth	0.037	0.032	0.032	0.032	0.032	0.037
Lime in air-dried fine earth	0.294	0.616	0.280	0.308	0.406	0.560
Potash in air-dried fine earth	0.524	0.718	0.563	0.714	0.466	0.582
Manganese as Mn ₃ O ₄ in air-dried fine earth	0.070	0.040	0.040	0.040	0.090	0.100
Total soluble salts (dried at 150° C.).....	0.458	0.580	0.097	0.399	0.075	0.084
Assumed composition of the soluble salts—						
Calcium carbonate	0.017	0.037	0.008	0.012	0.020	0.018
Calcium sulphate	0.031	nil	nil	nil	0.003	0.007
Calcium chloride	nil	nil	nil	nil	nil	nil
Magnesium carbonate ...	nil	0.006	nil	0.017	0.006	nil
Magnesium sulphate	0.025	0.066	0.012	nil	0.012	0.002
Magnesium chloride	0.039	nil	nil	nil	nil	0.007
Sodium carbonate	nil	nil	nil	0.016	nil	nil
Sodium sulphate	nil	0.019	nil	0.071	nil	nil
Sodium chloride	0.269	0.386	0.043	0.267	0.020	0.031
Pot Test (five seeds planted)—						
Weight in milligrammes of crop six weeks after planting	624	806	*522	994	1,014	897

*Four plants.

8. MOUNT BRYAN.

The bare patch sample from Mount Bryan is a fair quality clay soil except for the high content of soluble salts (1.290 per cent.), which accounts for its sterility. The pot experiment confirms the analysis. It is interesting

to note that of the adjacent soils and subsoils 1B, 2A, and 2B, the one which contains no manganese salts (2A) gave a better crop than either of the other two samples, while subsoil 3B gave a somewhat better growth than the soil 3A, possibly for the reason that it is free from manganese salts. The pot test confirms the analysis and indicates that the excessive salty material makes the soil sterile.

Soils from Mount Bryan.

Classification.	1A.	1B.	2A.	2B.	3A.	3B.
	Clay.	Limestone.	Clay	Clay.	Clay.	Clay.
Reaction of soil to litmus ...	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline	Alkaline
Percentage of fine earth	84.10	51.40	98.20	97.40	96.40	88.60
Nitrogen in air-dried fine earth.	0.183	0.112	0.192	0.158	0.204	0.169
Phosphoric acid in air-dried fine earth	0.057	0.072	0.062	0.065	0.075	0.087
Lime in air-dried fine earth ..	2.030	15.230	1.590	1.160	2.550	3.420
Potash in air-dried fine earth.	0.607	1.229	0.306	0.466	0.782	0.981
Manganese as Mn3O4 in air-dried fine earth	0.040	0.030	nil	0.010	0.020	nil
Total soluble salts (dried at 150° C.)	1.200	0.334	0.346	0.465	0.160	0.159
Assumed composition of the soluble salts—						
Calcium carbonate	0.032	0.019	0.033	0.036	0.038	0.038
Calcium sulphate	0.159	nil	0.044	0.064	0.014	nil
Calcium chloride	0.033	nil	0.022	0.019	0.003	nil
Magnesium carbonate ...	nil	0.013	nil	nil	nil	nil
Magnesium sulphate	nil	nil	nil	nil	nil	0.010
Magnesium chloride	0.106	nil	0.032	0.051	0.024	0.008
Sodium carbonate	nil	0.016	nil	nil	nil	nil
Sodium sulphate	nil	0.034	nil	nil	nil	nil
Sodium chloride	0.853	0.236	0.140	0.218	0.033	0.076
Pot Test (five seeds planted)—						
Weight in milligrammes of crop six weeks after planting	nil	572	1,001	552	767	800

GENERAL REMARKS.

Viewing all the analytical data set out in the accompanying tables, it will be concluded that the sterility of the soils from the "bare patches" is, in most cases, not due to a deficiency in one or more of the ingredients which are regarded as essential to plant growth. It is due rather to the presence of excessive quantities of soluble substances which in smaller quantities may not be injurious, and which possibly may be necessary or advantageous to plant growth. The substances, being soluble in water, form a mineral water which is the medium whereby plant food is carried from the soil to the growing plant. Just as with animals, one individual can grow and possibly thrive by the use of saline water which could not be tolerated by

another kind of animal, or a different individual of the same kind of animal, so plants show varying degrees of tolerance to saline waters, and the degrees of tolerance are altered by the nature of the salts forming the saline water. For instance, the limit for wheat in the case of common salt is about 0.25 per cent. of the soil, but is probably double that quantity in the case of sodium sulphate, and about a tenth of the quantity with sodium carbonate.

When the quantity of soluble salts exceeds a certain amount it is practically immaterial what the nature of the salt is. Thus, in the case of wheat, if the total amount of soluble salt in the soil exceeds $\frac{1}{2}$ per cent. the wheat growth will be more or less seriously interfered with. This interference may be caused by the altered density of the aqueous solution absorbed by the plant interfering with the proper functions of endosmosis and exosmosis, and thus preventing cell development, or it may very probably be due to some extent to the fact that saline solutions have the remarkable power of coagulating "solutions" of colloidal substances and rendering colloids insoluble. As the plant may depend on the colloidal "solution" for its supply of food, if the colloids are thrown out by the salts (electrolytes) the plant is robbed of its sustenance and fails to make growth.

Remedy.—With respect to the methods to be used to overcome the obstacles to plant growth, and the means to be adopted to make these bare patches productive, I am not qualified to give an opinion. This is a problem for the agriculturist. It may, however, be of assistance to consider one or two suggestions disclosed by the analysis. In each case the "subsoil" contains just about as much salt as the "soil" above it; consequently there is nothing to be gained by stirring up the subsoil in the hope of diluting the soil, and thus diluting the percentage of salts. The pot experiments, however, indicate that (except at Carrieton and Oladdie) in some way or other the subsoil is better than the soil. It is probable, therefore, that the salts are brought up from a greater depth than the 12in. represented by the soil and subsoil samples, and tend to become concentrated in the upper layer. The first object would be assisted by keeping the surface of the soil broken up to conserve the soil moisture and prevent undue evaporation, while the second might be brought about by so deeply draining the site of the patches that the winter rains can wash the salts out of the soil or so distribute them as to render them harmless.

EXTRACTS FROM TRADE COMMISSIONER'S REPORTS.

MEAT FOR GERMANY.

"From reports to hand I notice that the foot and mouth disease amongst cattle in Germany, in spite of most vigorous precautions, is continuing to spread in many districts, and has now broken out for the first time in the south of Germany. The consequence is that many of the smaller peasants are getting frightened of losing their cattle, and are selling the healthy ones as soon as possible to the slaughter-houses. It is therefore estimated that in a few months' time the price of cattle will be considerably higher even than it was last year.

"Some time ago I informed you of the gradual opening up of the frontiers for French live cattle, but that can only be an insignificant help, as the quantity available for export from France is very little, and meat is quite as dear in Paris as in Berlin. It is considered that, in addition to the factors prevailing in Germany for some time past, the meat question will be one of considerable agitation for the Labor and Socialistic parties during the elections next summer, and it will be Australia's opportunity to have the German newspapers well supplied with articles on the meat question.

WINE FOR GERMANY.

"Improbable as it may seem, I believe that sooner or later there will be a large outlet for Australian wine in Germany, if properly worked. In the meantime, however, I have made inquiries as to whether we can supply grape lees and argols, the same being used by chemical works for the manufacture of tartaric acid. At the present time supplies are received from Chili, Italy, and France, and as this produce is not subject to duty it struck me that Australia might compete just as well as Chili, unless, of course, we are able to use it up locally. I am informed that it should contain between 30 per cent. and 70 per cent. of tartaric acid, and the sale, of course, can only be made on the basis of the percentage contained. I am forwarding a sample taken from a consignment from Chili, so that any winemaker interested can see what it is like.

BUTTER.

"The position in regard to colonial butters is exceptional, there being at the present moment a difference of from 16s. to 18s. per cwt. between best colonial and the best Danish. The demand this past week has not been quite that which was expected, there being only about 1s. improvement during the week. It is confidently believed that a much better demand and a better price will take place shortly. The very choicest Victorian butters are offering at from 100s. to 102s., and second grades from 94s. to 96s."

OUR FEATHERED FRIENDS.

PROTECTED NATIVE BIRDS.

The importance of protecting the insectivorous species of our native birds becomes more apparent each year, with the increase of insect pests in our gardens and orchards. In order to assist in the identification of those harmless and useful native birds which are protected by law, we publish in this issue colored plates and descriptions of six species, and the series will be continued in subsequent numbers of the *Journal*.

The work owes its origin to the efforts of Mr. Thomas Duffield, Secretary to the Commissioner of Crown Lands. The descriptions are from the pen of Mr. A. G. Edquist, Lecturer in Nature Study to the Education Department; and the colored drawings are by Mr. C. Wall, Government Artist.

The Birds Protection Act of 1900 provides that the following birds shall be absolutely protected the whole year, whether on private property or elsewhere :—

Owls.	Native tits.
Mopokes and night jars.	Tintacks and ephthianuras.
Swifts.	Pipits and larks.
Swallows and martins.	Reed warblers and rush larks.
Laughing jackasses and kingfishers.	Bower birds.
Wood swallows.	Tree-creepers.
Diamond birds (or pardalotes)	Cuckoos.
Piping crowshrikes (or native magpies).	Stone plovers or night curlews.
Butcher birds and small crowshrikes.	Ibis and spoonbills.
Magpie larks.	Hérons, bitterns, egrets.
Blue doves, thickheads, shriketits, and bell birds.	Seagulls.
Thrushes.	Terns (or sea swallows).
Fantails (or wagtails), and flycatchers.	Cape Barren geese.
Robins.	Emus.
Superb warblers, emu wrens, blue wrens, and wrens.	Swans.
	Plovers.
	Oyster-catchers.
	Dottrells.
	Kestrels.
	Glass Parrots.

It is illegal to kill, wound, destroy, or take any of these birds at any time, or to take out of the nest or destroy in the nest the young or the eggs of any of these birds; nor may any person sell or offer for sale a skin or feather of any protected bird, or any article made therefrom, or in which the same is used.

The foregoing prohibition also applies to wild geese between June 1st and December 20th of each year; wild ducks, bustards, and native turkeys between August 1st and December 20th; quail, miner, honey-eaters, all kinds of doves, native pigeons, parrots, and all other birds not already mentioned, except unprotected birds, between July 1st and December 20th. Quail are further protected south of Bordertown to March 1st, yearly.

The following birds are not protected, and may be killed or taken at any time :—

Crows.	English starlings.
Wattle birds.	English chaffinches.
Silver-eyes.	English house sparrows.
Cormorants.	Rosella parrots.
Sulphur-crested cockatoos.	English blackbirds.
Hawks.	English goldfinches.
Snipe.	Pelicans.

It is not only to the farmer and gardener that the native birds are useful, owing to their destruction of aphides, grubs, caterpillars, beetles, snails, and slugs, which would otherwise devour the crops. In the bulletin dealing with this subject, and issued by the Department of Intelligence, Mr. Edquist writes—"The killing of our wading birds each year not only renders South Australia ever more prone to plagues of grasshoppers, but is most certainly a prime cause of the decline of our fish resources. In ancient Egypt the ibis was valued so much that it was regarded as sacred, and called the sacred ibis. Why? Egypt was at times subject to plagues of locusts, and of all birds the ibis helped most to rid the land of the plague by devouring the locusts in thousands. Mr. D. Le Souef, Director of the Melbourne Zoological Gardens, has calculated from results of observation that in a day one ibis is responsible for the destruction of no fewer than 2,410 grasshoppers, or so-called locusts. Yet each season this lovely and useful bird, together with numbers of cranes (herons), spoonbills, and egrets fall victims to the sportsmen who, in ignorance of their value, shoot them along with ordinary game. It is the decimation of such birds which leads to the ever-increasing multitudes of crustaceans (crabs and yabbies) that destroy fish spawn and young fish hatching out in the Coorong and lakes at the Murray Mouth."

TAWNY-SHOULDERED PODARGUS, OR "FROGMOUTH."

SCIENTIFIC NAME : *Podargus humeralis*. *Podargus* (Greek) : swift-footed, on account of its swift and silent flight ; *humeralis* (Latin) : of the shoulder, alluding to the tawny shoulder of the bird.

SIZE.—The podargus is about the size of a white cockatoo, and measures from beak to tail about 18in.

BILL.—The bill of the frogmouth is leaden-colored and very large, but obscured with fine projecting hairlike feathers. The wide open mouth reminds one of that of a frog ; hence the popular name frogmouth.

FEET AND LEGS.—The feet and legs are greyish brown.

PLUMAGE.—The general color varies to some extent. In some localities the podargi are much greyer than in others. This variation in color is probably due to environment, for in the sugar-gum country of Eyre's Peninsula the grey appearance of the bird matched that of the rough bark of the trees, and no doubt helped to protect the birds when asleep in the daytime. The head is covered with brown feathers, each marked with a thin light stripe and tipped with dull white. The feathers on the back are brown, speckled with grey and dark-brown. The wings are light-brown, spotted with dark-grey and buff. These light markings give the appearance of indistinct bands across the wings. The under side of the wing presents a similarly barred appearance, with dull white markings. The tail feathers are light-brown, each having a dark spot near the extremity, which is tipped with white. The whole effect is light-brown barred with dark-brown. The face and under surface of the body is of a light-grey color marked with brown, each feather having a longitudinal brown streak down the centre, which gives a striped appearance to the plumage.

HABITAT.—The podargi prefer country well timbered with eucalypts.

FOOD.—Their food consists chiefly of the larger nocturnal insects and of small animals such as mice and birds.

NEST.—This is composed of light dead twigs, loosely woven to form a shallow plate-shaped nest. The usual place selected by the bird is in a fork made by branches rising from a large horizontal limb. The breeding season lasts from August to January.

EGGS.—The eggs, which number two to three in a clutch, are white, oval in shape, and measure about 1½in. x 1¼in.

Note.—When the podargus is disturbed during the day time, it points its beak upward and parallel to any limb near it. In this way, by keeping very still and closing its eyes, it mimics a dead branch and saves itself from detection.



PLATE 1. THE OWL



BOOBOOK OWL (MOPOKE).

SCIENTIFIC NAME: *Athene boobook*.—*Athene*, name of the Greek goddess of power and wisdom, to whom the owl was sacred; *boobook*, a native name in imitation of the bird's cry.

SIZE.—The boobook owl, so named from its cry—which has been variously interpreted as boobook, moopook, mopoke, and morepork—is slightly smaller than a white cockatoo, measuring about 16in. from the beak to the extremity of the tail.

PLUMAGE.—The general effect is mottled brown. The head, back, and upper sides of the wings and tail are brown. The wing feathers are spotted with light markings, and the tail feathers are irregularly barred with brown. The breast is colored light brown, which shades off into the dull white on the abdomen. The whole under surface is striped from chin to tail with dark markings that give it an irregularly striped appearance.

HABITAT.—The boobook owl prefers well-timbered country and frequents the neighborhood of farm houses.

FOOD.—The food of this valuable bird consists chiefly of large nocturnal insects and such small animals as mice and lizards.

NEST.—The nest is always in the hollow of a bough or tree trunk. Nesting takes place during November and December.

EGGS.—The eggs, which are white, are laid upon rotten wood within the hollow. The number is usually three. In shape the eggs are rounded, and measure about $1\frac{7}{8}$ in. x $1\frac{1}{4}$ in.

STRIATED PARDALOTE, OR DIAMOND BIRD.

SCIENTIFIC NAME : *Pardalotus striatus*.—*Pardalotus* (Greek), spotted like a leopard, in allusion to the tiny white spots which dot the head and sometimes the body of this genus ; *striatus* (Latin), streaked, from the white edges of the wing feathers, which gives to the closed wing a striped appearance.

SIZE.—This little bird is only about 4in. long, and at first sight looks less than that, owing to its queer short tail feathers.

BILL.—Its beak is short, and grey to black in color.

FEET AND LEGS.—The color of the legs and feet is greenish grey.

PLUMAGE.—The forehead and crown of the head are nearly black. The back of the neck and sides of the face are speckled with white on dark grey, the speckled appearance being due to a short white mark down the centre of each feather. A broad streak, which is orange colored near the nostril, extends backward over the eye, where it merges through yellow into white, until it reaches the ear. The throat and chest are yellow, and the abdomen white, shading into light brown near the tail. The neck and shoulders are brownish grey, the rump being colored a little lighter brown. The wing feathers are nearly black, and edged with white at or near the tip, the white edges giving them a streaked or striated appearance. On the wing is a distinctive red spot. The tail is black, tipped with white, and is very stumpy.

HABITAT.—The pardalote likes those localities that are timbered with eucalypts.

FOOD.—The food of this little bird consists chiefly of insect life.

NEST.—The nest is a small rounded one, made of fine grass, and situated in a hollow either in a river bank or in a dead limb of a tree. The time of nesting is during September, October, and November.

EGGS.—The eggs are white, and usually four in number. They are small, oval, and measure about $\frac{3}{4}$ in. x $\frac{1}{2}$ in.



NAT SIZE



NAT SIZE

YELLOW-TAILED TOMTIT, OR YELLOW-TAILED THORNBILL.

SCIENTIFIC NAME: *Acanthiza chrysorrhoa*.—*Acanthiza*, from the Greek *akantha*, a thorn, in reference to the thorn-like bill; *chrysorrhoa* (Greek), streaming with gold, in allusion to the color of the rump and upper tail-coverts.

SIZE.—This tiny bird is barely 4in. long.

BILL.—The beak of the tomtit is small, but sharp and well adapted for picking up small insects.

FEET AND LEGS.—Its feet and legs are dark grey.

PLUMAGE.—The forehead is speckled white and black, on account of each black feather being tipped with a white spot. A light streak extends from the nostril over the eye. The back of the head, the neck, back, and wings are greenish brown. The rump and upper tail-coverts are colored bright yellow. The tail feathers are dark grey and tipped with dull white. The sides of the face and throat are light grey. The chest is of a yellowish-white color, which merges into the dull white color of the abdomen.

HABITAT.—The small bushes growing on grass land and open timbered country is the favorite haunt of the *acanthiza*.

FOOD.—For the most part these little tits feed on minute animal life, and may be regarded as insectivorous.

NEST.—The nest of the yellow-tailed tit is dome-shaped, and very often has a supplementary open nest on the top, which gives the whole structure a two-storied appearance. While the female is sitting upon her eggs within the lower nest, her male companion may be seen occupying the cup-shaped nest at the top. The whole nest is built of grass, cleverly woven together and lined with feathers and other soft materials procurable, such as wool. The shallow cup at the top is not lined. The entrance to the nest proper is a small round hole at the side, near to the bottom.

EGGS.—The eggs are colored white to flesh pink, and ornamented with very minute pink spots near the broad end. A full clutch contains four or five eggs, each measuring about $\frac{3}{4}$ in. long x $\frac{1}{2}$ in.

There are seven other species of *acanthiza* in South Australia.

REED WARBLER.

SCIENTIFIC NAME: *Acrocephalus australis*.—*Acrocephalus* (Greek), pointed head, in allusion to the acute-angled face; *australis* (Latin), of the Southern Hemisphere.

SIZE.—In size this merry little songster is rather larger than the sparrow.

BILL.—Its bill is rather long and pointed, and admirably adapted for catching insects.

FEET AND LEGS.—The legs and feet are of a dark greyish-brown color.

PLUMAGE.—Its plumage is colored in varying shades of russet or rusty brown. The crown, sides, and back of the head, together with the back of its body are russet brown; the throat and breast are colored light buff.

HABITAT.—The habitat of the reed warbler is among the reeds that border lakes, lagoons, swamps, and creeks, where it also builds its nest.

FOOD.—This little songster lives chiefly on insect life.

NEST.—The nest, which is built of soft material stripped from dead reeds and rushes, is about 5 in. in diameter. It is usually built between three or four upright reeds, about a foot or two above the water. The reeds pass through the material of which the nest is made.

EGGS.—The eggs, which are generally laid during November or December, are four in number, about $\frac{1}{2}$ in. long, and of a dull greenish-white color blotched with varying shades of brown.



NAT. SIZE



MAGPIE LARK, MURRAY MAGPIE, PIED GRALLINA, MUDDLARK,
OR PEE-WEE.

SCIENTIFIC NAME: *Grallina australis*.—*Grallina*, from the Latin *gralla*, stilts, in allusion to the legs; *australis* (Latin), of the Southern Hemisphere.

SIZE.—About the size of a dove; a full-grown bird measures about 10in. in length.

BILL.—Its bill is light grey, tipped with black.

FEET AND LEGS.—The legs are colored dark grey to black.

PLUMAGE.—The general appearance of the bird is black and white; hence the name “*pie*d mudlark.” The top and back of the head are black. The back is black, tinged with bronze green, similar to the greenish tint seen on the feathers of black fowls. The tail feathers are black with white tips. The breast is white. The female has a white face, but the male has a black one. The wing has five feathers tipped with white, making a white bar across it. This bird is a very quick runner, but has rather a heavy flight.

HABITAT.—The mudlark is generally found hunting along the muddy bed or a river or creek. It finds most of its food living on the mud banks of lagoons, marshes, and streams. After a heavy rain they will hunt for insect life in the fields that border streams.

FOOD.—Insect life. It also eats pond snails, in which liver-fluke develop. On this account it is a most valuable bird.

NEST.—The nest is built of mud, and often reinforced with straw and grass and lined with feathers. It is about 6in. wide, and half as deep. Usually it is placed upon a horizontal limb.

EGGS.—The full clutch of eggs numbers four. They are pinkish white, and generally spotted with light-brown, and bluish-grey markings that appear below the surface. The eggs measure about $1\frac{1}{2}$ in. \times $\frac{3}{4}$ in. The magpie lark nests during the months of September, October, and November.

NOTE.—They have a shrill, peevish cry of two syllables which sound like “pee-wee.”

AGRICULTURE IN OTHER LANDS.

By Professor PERKINS, Principal of Roseworthy Agricultural College.

FRANCE.

(Continued from page 765.)

The chief red varieties now grown are Aramon and Carignane, both of which we possess, but neither of which yield as heavily here as in the south of France. On the other hand, South Australian wine made from these varieties is fuller and richer in alcohol than is the case in France. Of white varieties the principal ones in use are Terret, Piquepoule, and Clairette, which we do not possess, or at all events are only represented by a few odd plants in our vineyards.

Apart from vineyards planted in sand and those which can be flooded in winter, all this vast area has been replanted on American stock between 1876 and 1892. In this connection Rupestris and Riparia stock are at present almost exclusively made use of.

How great must be the care and attention bestowed upon general cultural operations may be gauged by the high amount of working expenses per acre disbursed each year in a country in which manual labor is not very highly remunerated. I had occasion to visit the cellars and vineyards of the Compagnie Des Salins du Midi. They own a vineyard about 2,000 acres in area, the general working expenses of which are represented by £32,000, that is to say about £16 an acre. This figure is inclusive of vintage and wine-making expenses, but it is exclusive of all interest on capital outlay. Working expenses calculated on this basis I found to be generally estimated at from £13 to £16 an acre, although I was assured that in many cases this average is exceeded. The expenses involved in the first three years of bringing a new vineyard into bearing, exclusive of the cost of the land, I found to be variously estimated from £48 to £64 an acre; and as the life of a grafted vineyard does not appear to average more than 25 to 30 years this initial expense represents a heavy burden to be deducted from future gross profits.

From another point of view the great importance of the vine-growing industry to the south of France may be gauged by the number of people directly or indirectly concerned in it. The 1909 statistics show French vineyard owners to be represented by 1,601,332 individuals, of which 151,499 belong to the four Languedoc Departments. To these must be added all laborers interested, coopers, teamsters, wine merchants and their staffs, &c.

An interesting table has been drawn up by M. Barbut showing the extent to which southern vineyards are split up amongst small owners. The table which is given below has reference to the Department of Aude, in which there were reckoned to be 33,047 vineyard owners. Of these—

13,888, or 42 per cent.,	owned less than $2\frac{1}{2}$ acres
14,160, or 43 per cent.	“ from $2\frac{1}{2}$ acres to $12\frac{1}{2}$ acres
2,666, or 8 per cent.	“ from $12\frac{1}{2}$ acres to 25 acres
1,320, or 4 per cent.	“ from 25 acres to 50 acres
443, or 1·4 per cent.	“ from 50 acres to 75 acres
570, or 1·7 per cent.	“ over 75 acres

This southern wine is thin, light, and very little alcoholic; the great bulk of it is consumed before next vintage; and, indeed, so great was the shortage at the time of my visit that wine practically warm from the fermenting vats was being disposed of to the retailers. In the circumstances one can understand that the cellar price of wine must, according to the seasons, vary within very wide margins. So great is the local demand for wine this year that I found growers refusing 1s. 8d. a gallon at the cellar door, who a few years back would have been delighted with 6d. As indicating the variations from year to year of new wine, I append below a table due to M. Jules Leenhardt-Pommier, in which are indicated year by year the prices realised by the same owner for 71 years.

Year.	Price in Pence per gall. <i>d.</i>	Year.	Price in Pence per gall. <i>d.</i>	Year.	Price in Pence per gall. <i>d.</i>	Year.	Price in Pence per gall. <i>d.</i>
1833.....	$3\frac{3}{4}$	1851.....	$3\frac{3}{4}$	1869.....	7	1887.....	$15\frac{3}{4}$
1834.....	—	1852.....	$3\frac{3}{4}$	1870.....	$5\frac{1}{4}$	1888.....	$8\frac{1}{4}$
1835.....	4	1853.....	$8\frac{1}{2}$	1871.....	$7\frac{3}{4}$	1889.....	15
1836.....	—	1854.....	$11\frac{1}{2}$	1872.....	$7\frac{3}{4}$	1890.....	$9\frac{3}{4}$
1837.....	6	1855.....	$11\frac{1}{4}$	1873.....	15	1891.....	$8\frac{3}{4}$
1838.....	—	1856.....	$19\frac{1}{2}$	1874.....	9	1892.....	9
1839.....	$4\frac{1}{4}$	1857.....	11	1875.....	3	1893.....	$5\frac{1}{2}$
1840.....	$4\frac{1}{2}$	1858.....	$4\frac{1}{2}$	1876.....	9	1894.....	$6\frac{1}{2}$
1841.....	—	1859.....	$8\frac{1}{2}$	1877.....	$13\frac{3}{4}$	1895.....	$8\frac{1}{4}$
1842.....	$4\frac{1}{2}$	1860.....	$11\frac{1}{4}$	1878.....	$16\frac{1}{4}$	1896.....	6
1843.....	$3\frac{1}{2}$	1861.....	$6\frac{1}{4}$	1879.....	$13\frac{3}{4}$	1897.....	$7\frac{1}{2}$
1844.....	—	1862.....	$5\frac{1}{4}$	1880.....	$18\frac{1}{4}$	1898.....	$8\frac{1}{4}$
1845.....	$5\frac{3}{4}$	1863.....	$5\frac{1}{4}$	1881.....	16	1899.....	4
1846.....	—	1864.....	$5\frac{1}{4}$	1882.....	$20\frac{1}{2}$	1900.....	$3\frac{1}{2}$
1847.....	$4\frac{1}{4}$	1865.....	$3\frac{3}{4}$	1883.....	$18\frac{1}{4}$	1901.....	4
1848.....	$3\frac{1}{2}$	1866.....	$8\frac{1}{4}$	1884.....	$20\frac{1}{2}$	1902.....	$7\frac{1}{4}$
1849.....	3	1867.....	$7\frac{3}{4}$	1885.....	$13\frac{3}{4}$	1903.....	$11\frac{1}{4}$
1850.....	$3\frac{1}{4}$	1868.....	$6\frac{1}{2}$	1886.....	$13\frac{3}{4}$		

This table does not, of course, pretend to set out what have been the average prices for good south of France wine over the 71 years concerned, since experience has shown that in the course of the same season prices may vary from simple to double, according as sales are effected at the beginning or at the end of a year. The table is interesting, however, as indicating the prices realised for new wine by the same vineyard-owner over a period of 71 years under identical methods of sale. In this connection it should be noted that in the south of France vineyard-owners never retail their own wine. Wine merchants take it off their hands a few months after manufacture; indeed, in extreme instances, a few days after it has left the fermenting vat; and in any case it is the object of every vineyard-owner to clear his cellar before the advent of the new vintage. The prices given, therefore, represent cellar door prices realised for the whole of the wine made, when from three months to nine months old. When we see prices varying from 3d. to 1s. 8d. we must realise how much more of a speculation wine-growing must be in the south of France than is the case here with our relatively steady prices.

Judged by our standards, the consumption of wine in France is enormous. In 1907 it was officially estimated as 1,364,000,000galls. That the French people are by far the heaviest wine-drinkers in the world the following statistics prove very clearly. The average yearly consumption per head of population, including women and children, is represented by—

180 quarts in France	15 quarts in Servia
95 " Italy	7½ " Germany
83 " Spain	7 " Belgium
27 " Roumania	1½ " North America
20 " Hungary	1¼ " England
17 " Austria	

It is contended in the south of France that wine is not so much a thirst-quenching liquid as a foodstuff which is as essential to man as bread, particularly in warm climates. In that sense southern working men practically live upon it. Vineyard hands always receive wine as part payment of their wages. A young laborer will consume about two quarts daily; an older man as much as four. A local saying describes wine as the milk of declining years. Nor can it be said that drunkenness is at all prevalent in France, and, indeed, when detected, may usually be traced to the use of stimulants other than wine. It must be recognised that the wines in general use are very much lighter than our own, and, as such, far less heavy.

VINE DISEASES.

Whilst at Montpellier I had occasion to pay a visit to the National College of Agriculture. Unfortunately this institution was in recess, and beyond those in immediate charge of the buildings there was nobody present. I

had occasion to notice that externally at all events very few changes had taken place here since I last saw the college in 1890. Later on I met M. Louis Ravaz, Professor of Viticulture at the college, on his private property at Lunelvieil, and he was good enough to give me information on various points of interest relative to vine-growing in the south of France. I found him more optimistic than most of the growers as to what is likely to prove the average life of grafted vineyards, although he admitted that the task of filling up blank spaces has now entered into the regular routine of every year's work. The death or weakening of grafted plants appears attributable to various causes: poor union between stock and scion, imperfect adaptation to the soil and climate of the stock, imperfect adaptation of stock to scion, diseases, &c.

In this connection there appears to be one form of disease which has been responsible for a good many blanks in grafted vineyards. This disease goes by the local name of "court noué." Its nature and cause appear more or less obscure. The shoots of the diseased vines show abnormally short internodes and general weakness of growth. Very frequently the shoots instead of being cylindrical in outline are more or less flattened; nor are slight variegations of the leaves at all uncommon. At vintage time, when the foliage of normal plants begins to droop and assume yellowish tints, plants affected by court noué always carry leaves of a bright green color, and this abnormal color appears to persist right up to the approach of cold weather. It follows that their wood is never properly matured, and the correspondingly weak plants gradually die out, or at all events prove altogether unprofitable at vintage time. I have occasionally noticed similar features on South Australian vines, particularly in the case of Grenache. M. Ravaz is inclined to attribute the disease to physiological troubles, resulting from the influence of low temperature on relatively weak plants.

Another disease which appears to be frequently responsible for the appearance of blank spaces in grafted vineyards, is what is known as "apoplexy," as distinct from "folletage." The latter disease, as is well known, is usually attributed to sudden change in weather conditions, whilst, according to M. Ravaz, "apoplexy" is caused by an internal parasitic fungus (*Polyporus*), which penetrates the internal economy of the plant through the pruning scars, and by giving rise to a sort of dry rot gradually undermines it. At first the plant may show signs of weakness on one or more of its limbs only; the latter carry poor, sickly growth, and eventually one or more limbs may die back completely. In other cases the plants die back altogether without much previous warning. The presence of the parasite may always be detected by examining the layers immediately below the bark of any affected portion of the plant; the latter will always show an abnormal brown color. This disease I think I have also noticed occasionally in South Australia, particularly in the case of vines that had been grafted. Beyond replacing

weakly and dead plants there does not appear to be much that can be done to check the disease.

"Brunissure," or the formation of brown discolored patches on the leaves of not only vines but of other plants as well, which was formerly attributed to the action of an internal parasite, M. Ravaz believes to be the result of over-production of fruit by the plants; the leaves, when this is the case, are apt to be more or less sickly and weak, and as such liable to be burnt up by the rays of the sun.

When a new grafted vineyard is established, M. Ravaz asserts it to be the usual practice in this district to plant out ungrafted American vines, and to wedge-graft the latter in the succeeding year. Nurserymen, of course, prefer to sell ready grafted plants for the purpose. Whilst in the neighborhood I had occasion to admire several beautifully planted young vineyards in their first leaf. There was hardly a single blank to be noted, and the growth for first season growth was magnificent.

In the immediate neighborhood of Montpellier are the well-known Richter American Vine Nurseries. From the latter have been drawn many of the American vines now being planted in Victoria. These nurseries are very extensive, putting out between 2,000,000 and 3,000,000 grafted plants yearly. Their general health and appearance was, on the whole, good, although fungus diseases had proved very troublesome this season. The cuttings are bench-grafted, and when grafted average about 12½ in. in length—the scion is allowed only one eye. These grafted cuttings are planted out as closely as possible together in rows 15 in. to 16 in. apart; they are then heavily mounded up, and continue in this condition until the shoots of the scions are about 4 in. in length. The mounds are then levelled down, with the result that wherever the union between stock and scion is weak the plants die, whilst the sound unions are hardened by exposure to the weather. Many plants die out in this fashion, and from the action of other causes, with the result that at the end of a season very rarely more than 50 per cent. to 60 per cent. of sound rooted plants are secured.

Trench ploughing is the usual practice here prior to planting out a new vineyard. I had occasion to see a 10-horse team harnessed two and two on a single-furrow plough at this kind of work. They were turning over a furrow 17 in. to 18 in. deep.

It is curious to find the value of soil tillage questioned in a country in which it is usually practised with unusual thoroughness; such, nevertheless, appears to have been the case some time back. To test the point, in three different localities the soil of a given area of vineyard has been cement concreted over, leaving only small openings through which the vine stems can penetrate, and towards which the drainage water flows. This work was done, I understand, at the rate of about 7d. a square yard. I had occasion to see some of these vines, and I must say that they appeared to me quite as healthy

and strong-growing as their neighbors. I was given to understand, too, that the fruit yield had over past years proved quite satisfactory.

SOUTH AUSTRALIA AND PHYLLOXERA.

Whilst I was in contact with men competent to form an independent opinion on the subject I took the opportunity to explain the attitude that South Australia had taken up on the phylloxera question. I explained that a reserve fund had been accumulated gradually by a moderate vineyard tax, and that we absolutely prohibited the introduction of any portion of a vine into our territory. The opinion was unanimous that there existed no middle course open to us, and that it would be the most egregious folly to introduce American vines until such time as we could not do without them. I was pleased to find views which I have always very strongly held thus authoritatively confirmed.

SHEEP IN LANGUEDOC.

However much wedded the four Languedoc Departments may be to vine-growing, sheep are not unknown to them; indeed, they are found to associate together very well. I came across some flocks of sheep imported from Algeria for topping-up purposes. The latter are grazed partly in the hilly waste lands and partly in the vineyards so soon as the vintage has been completed. I cannot say that I was much impressed with the general appearance of the sheep: they are generally long-limbed, long-necked, narrow, flat-bodied animals.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, March 8th, there being present Messrs. J. W. Sandford (chairman), J. Miller, A. M. Dawkins, and C. Willcox.

Formal business only was transacted.

The following gentlemen were approved as members of the undermentioned Branches:—Messrs. E. E. Johnson and Sgt. Tuohy, Clare; W. Pappen, Uraidla; P. Scroop, Cherry Gardens; C. Wright, Meningie; T. R. Brinkworth, J. Bussenschutt, F. H. Bussenschutt, and G. R. Kluge, Paskeville; D. Davies, Renmark; J. Wegner, Appila-Yarowie; M. O'Halloran, P. Wood, and G. McGregor, Whyte-Yarcowie; W. B. Prider, Penong; R. T. Brinkley and A. C. Hameister, Parrakie; W. Drewitt, Kalangadoo; G. Ray, Tatiara; D. Fox, P. Quinn, J. McQuilhan, and H. Atkin, Belahe North; P. Runball, Kybybolite; H. Lawrie, Port Pirie; C. J. Blakely, Longwood.

POULTRY-KEEPING.

OPERATIONS FOR APRIL.

BY THE POULTRY EXPERT (MR. D. F. LAURIE).

Export Table Poultry.—The numbers this year do not show so satisfactory an advance as might have been expected when the profitable nature of table-bird breeding is taken into consideration. The quality and condition show a vast improvement; the number of rejects is too small to notice. The excellent local prices and the opportunities in the oversea markets should induce poultry-breeders to enter largely into table-bird breeding. The light breeds, such as Leghorns, are to be preferred for egg production, but are almost valueless for table. Breeders are somewhat like sheep—they follow too easily. Breeders of Leghorns have so boomed the virtues of their birds that everyone is for egg production and but few for table-bird breeding. Adelaide is flooded by most miserable specimens not worthy of the name of table poultry.

Breeds.—The Wyandotte, in all its varieties, is a fowl that should be largely bred. It is a good layer, but it is folly to breed for eggs only. Many specimens of the laying strains are undersized runts. Although we might not have so many eggs, the industry would be better served if we had two Wyandottes for every Leghorn or other light breed. Buff Orpingtons and White Orpingtons deserve far more popularity—the hens lay fine brown eggs, and the chickens are splendid for table—they are not intended for heavy laying. Plymouth Rocks are very handsome fowls, and rank first in America; they are very good layers, and make good table birds. They carry rather much bone, but then they are large and heavy when full grown, and must have the necessary bone.

Green Food.—No time should be lost in preparing the ground for thousand-headed and Jersey kails, cabbages, rape, barley, &c. Kail and cabbage, lettuce and endive (these are very valuable) seed should be sown in beds and planted out later in drills. Rape and barley should be sown broadcast, and are well suited for sweetening the soil in poultry yards. Where any of the above is grown to supply green food, and not to sweeten soil, it will pay to manure the ground. Fowl manure, stable manure, &c., may be dug or ploughed in. Rape and barley may be topdressed with superphosphate

while growing. Kail, cabbage, &c., may have a little mixed with the soil in which each plant is set; later on they may have top dressings. Poultry should have far more green food than is usually given. Lucerne may be planted during this month, but the ground must be well worked. In cold localities a thin sowing of barley may be used as a shelter crop. For preference sow the lucerne by itself.

The Yards.—Dig over and grade all yards and arrange for drainage. A slight fall to a drain will keep the yards dry in wet weather. Disinfect with phenytas, carbolic, &c., to destroy parasites and their eggs or spores. Clay land will be much benefited by a heavy dressing of slaked lime or gypsum; it will render it less sticky. Work it in a few inches only. Repair netting, attend to gates and fastenings, clean out and disinfect houses, and lay in a supply of sand and earth (in a covered heap) for use during winter.

Coops, &c.—Repair or make coops for sitting hens, chickens, ducklings, etc.; get everything ready for use when required.

Incubators.—These should be dismantled and thoroughly cleaned. Boil the burners in soda and water, fit new wicks, and see that they work freely. Scrub the incubators inside and outside with hot water and soda. Renew anything needed. When dry, paint the incubators inside and out (every part) with a ten (10) per cent. solution of formalin. Dnty incubators are full of disease germs, which infect the chickens as soon as hatched. Machines should be cleaned and disinfected after each hatch. Use only high-grade kerosine.

Brooders.—All brooders should be dismantled and every part cleaned and scrubbed and disinfected as recommended for incubators. Very little will then be heard of the so-called white diarrhæa or "little chick cholera."

Quality of Food.—Breeders should beware of buying musty, damaged grain. There is a good deal sold. Fungoid growths are sure to result from the use of this unsuitable food, and the losses will be severe. Only the best grain should be used. Only those who are absolutely ignorant would advise the use of much of the rubbish now considered good enough. House scraps should be carefully selected, and on no account allowed to go stale. Boil them up every night and allow to simmer until thoroughly cooked. Mash and mix with bran and pollard for the morning meal. If you cannot arrange to give these house scraps in sweet condition, discontinue feeding them to poultry, or you will have many losses.

Stock for Breeding.—Should you require any, no time should be lost in obtaining them. Late comers always get the leavings, and these naturally are not the best. Obtain your stock from a reliable breeder. It is better to purchase a few good birds at a fair price than a large number of inferior birds. Many people have foolish ideas on the subject of poultry. They scout the idea of paying a fair price for good birds. Mongrels and culls are, if fat and young, worth table-bird prices, no more. Specimens of good laying

strains are worth a fair sum, as time and labor have been expended in perfecting such stock. Table birds should be bred from pure stock—mongrels do not pay.

Disease.—Chicken-pox has put in an appearance in many localities. If promptly dealt with it can soon be cured. Watch carefully for the appearance of small wart-like pimples, or scabs on the comb or wattles of a fowl. To effect a cure, bathe the affected parts with warm vinegar and water, equal parts. Dry with soft cloth and then apply carbolised glycerine (1 carbolie to 15 glycerine), or kerosine and oil equal parts. Formalin (a 2 per cent. solution) may also be used. Burn all rags at once and carefully disinfect and wash the hands. Keep children away from the birds. Thoroughly disinfect yards and houses and add Epsom salts to the drinking water or make a solution for mixing the morning mash—a packet (1oz.) for every 20 adults.

Prevention.—If you keep your yards and houses clean and disinfect occasionally and look well to the food and water supply you need fear no disease. If your houses are damp, ill-ventilated, draughty, or vermin-infested, you may expect trouble.

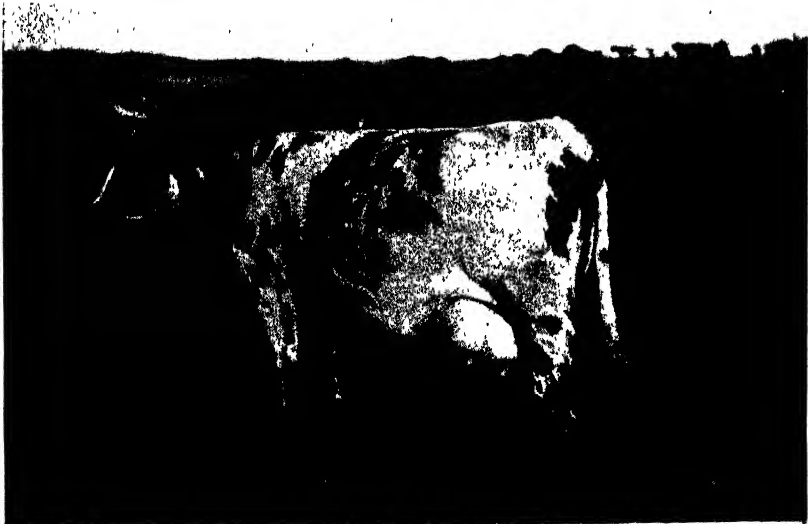
Some Poultry Houses and Yards.—It is with regret that I often notice ramshackle and disreputable structures doing duty as poultry houses and yards. It is a pity that the local authorities do not compel people to provide reasonable and neatly constructed accommodation. Many of these so-called houses are infested with tick and other vermin, and are a disgrace to their owners. Very shortly a campaign against disease and vermin will be undertaken, and under the Stock Act and perhaps with the aid of the health authorities some improvement will be made. The poultry tick must be eradicated without delay, and owners of infested premises are advised to take a friendly hint, and so render unpleasant proceedings unnecessary. Some of my country friends must make a move and, if necessary, burn down tick-infested structures, and build new and up-to-date stables, &c. People sometimes ride in nice-looking buggies which are swarming with tick; a case was recently reported to me. This is disgraceful.

Monthly Circulars, Advice, &c.—*To the Reader.*—I am sure you are willing to assist in building up a fine poultry industry in this State. Will you, therefore, kindly send postcard to me with the names and addresses of poultry-breeders in your neighborhood, so that the names may be placed on the mailing lists. Since the issue of last circular gratifying additions have been made to the mailing list, and scores of letters have been received and answered. All communications are answered. The Government policy is to assist poultry-breeders in every way, to give advice, and to encourage them to breed more fowls and produce more eggs and table birds. Send your eggs and table poultry to the Produce Department, Light Square, Adelaide, and a satisfactory market will be found for you, with prompt settlement.

Report on Laying Competitions.—This will be issued soon and will contain the monthly scores and values of eggs laid ; in addition many aspects of egg production will receive consideration. The information will be valuable to all poultry-breeders. A bulletin on " The Single Testing Method of Egg Production " is in the press and will be available soon. This has appeared in the *Journal of Agriculture* for March, and explains the practical and scientific application of the methods adopted at the poultry stations and in part by many breeders. The report and the bulletin will be sent post free on application.

Entries for the 1911-12 Laying Competitions.—I desire to express my appreciation of the hearty support accorded by breeders, and to hope that the results will do credit to our breeders and maintain the fine reputation our State enjoys as the land of high-class laying fowls.

To the Commercial Breeder.—To further study your interests and to advance the industry certain schemes are maturing, of which more in good time.



ANALYSES OF FERTILISERS.

By W. L. SUMMERS, Inspector of Fertilisers.

The following results of analyses of samples of fertilisers, taken during the past few months, are published for general information. In each case the certificate of constituents or guarantee registered by the vendor is shown in parentheses, thus (36 per cent.), immediately before the results of the analyses :—

Adelaide Chemical and Fertilizer Company, Limited—Mineral super., water-soluble phosphate (36 per cent.), 38.5 per cent, and 38.3 per cent. Guano super.—water-soluble phosphate (25 per cent.), 25.2 per cent; citrate-soluble phosphate (5 per cent.), 10.5 per cent. Wheat manure—water-soluble phosphate (28 per cent.), 27.95 per cent.; citrate-soluble phosphate (5 per cent.), 8 per cent.; acid-soluble phosphate (7 per cent.), 8.50 per cent.; nitrogen, (1.05 per cent.), 1.11 per cent. S.A. Super.—water-soluble phosphate (30 per cent.), 34.50 per cent. Super. B—water-soluble phosphate (16 per cent.), 16.8 per cent.; citrate-soluble phosphate (14 per cent.), 19.4 per cent. Bonedust—nitrogen (3.25 per cent.), 3.91 per cent.; tricalcic phosphate (43 per cent.), 47.8 per cent. Guano—water-soluble phosphate (20 per cent.), 28.60 per cent.

Bagot, Shakes, & Lewis, Limited—Japan super., water-soluble phosphate (38 per cent.), 43.3 per cent., 41.7 per cent.

Dalgety & Co.—Super., water-soluble phosphate (36 per cent.), 37.9 per cent.

Elder, Smith, & Company, Limited—Lawes' super., water-soluble phosphate (36 per cent.), 36.5 per cent.

Farmers' Co-operative Union—Superphosphate, water-soluble phosphate (39.75 per cent.), 39.75 per cent.

A. H. Hasell—Superphosphate, water-soluble phosphate (38 per cent.), 40.6 per cent.; "Jap" super., water-soluble phosphate (38 per cent.), 48 per cent., 41.8 per cent., and 40.1 per cent.

International Fertiliser Company of Australia—International A.A.B. Fertiliser, water-soluble phosphate (32 per cent.), 34.1 per cent.; nitrogen (1.75 per cent.), 0.83 per cent.

Mount Lyell Mining and Railway Company, Limited—Standard super., water-soluble phosphate (36 per cent.), 41.4 per cent.

Norman & Co.—"Reliance" super., water-soluble phosphate (36.89 per cent.), 36.6 per cent. and 34.2 per cent.

Wallaroo Phosphate Company—Super., water-soluble phosphate (36 per cent.), 39 per cent., 42.7 per cent.

Wills & Co.—Concentrated super. (90 per cent.), 93.40 per cent.; Globe super. (36 per cent.), 37.5 per cent.

FRUIT EXPORT SEASON.

The present season has now so far advanced that it is evident that the export from South Australia will be considerably in excess of the quantity anticipated, and had growers been able to secure more steamer freight it is quite certain that many thousand more cases would have been exported.

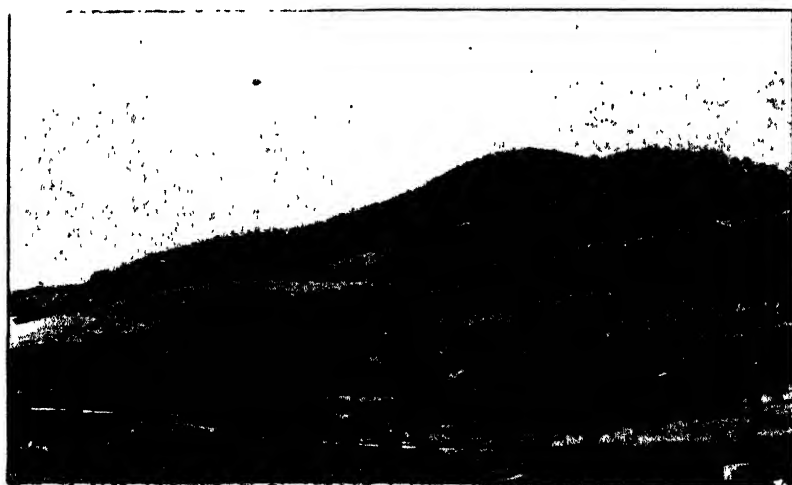
Shipping agents require growers to engage their space quite four months before the time of shipment, and it is not then possible to determine what their requirements will be. Rather than incur the risk of paying dead freight a very conservative estimate is made, which has been considerably exceeded by the actual result this season. Applications for more space have been unavailing, owing to the fact that all spare space was taken up months ago by Tasmania and Victoria, both States having a record export season. Many steamers have failed to find room for the quantity engaged by shippers, and the result of this will be that much fruit intended for shipment will now find its way into the local market.

The season may be said to have commenced with the sailing of the s.s. *Orontes* on February 24th, although prior to this about 1,000 cases were shipped to Bombay and Javanese ports. From this date up to and including March 31st, when the s.s. *Grosser Kurfurst* sailed, the quantity exported was as follows:—Thirty-six thousand and thirty-two cases apples, 5,047 cases pears, 274 cases grapes, and two cases peaches. Of these shipments London took 15,705 cases apples and 3,998 cases pears, while the Hamburg market has been supplied with 14,574 cases apples and 993 cases pears. The balance of the exports went to other Continental and Eastern ports. The present month will in all probability see the termination of the season so far as London and Hamburg are concerned, although several shipments will be made to South Africa and the East during May and June.

There are yet quite a dozen steamers due to call during this month, and as their bookings aggregate from 20,000 cases to 25,000 cases it will be seen that the figures for this State will be in the vicinity of 60,000 cases, which is, however, only one-half the quantity sent away last season. It is expected that about 9,000 cases apples and 3,000 cases of pears of the above total will be consigned to the Trades Commissioner for South Australia (Major Norton) for sale on behalf of growers shipping through the agency of the Government Produce Department. Taking the comparatively small season into consideration this quantity is very satisfactory, and certainly would have been exceeded had more space been available.

It will be remembered that when lecturing through the State Major Norton made out a very strong case for direct shipments to the outports of Great

Britain, notably Hull, Manchester, and Avonmouth (Bristol). Unfortunately the Department was unable to procure space for outports this season; hence all the fruit forwarded by the Government is being shipped to London and Hamburg. The Hamburg market is expected to be a profitable one for good fruit, especially for the earlier shipments, and it is gratifying to record that the best price obtained in this market last year was for fruit sold by the Government Produce Department. Every facility is offered to shippers of produce to avail themselves of the services of Major Norton in the disposal of their fruit, and this is being more generally recognised each year. Encouraged by the success of an experimental shipment of Duchess pears made by the Produce Department in January, 1910, every effort was made to follow it up with a much larger consignment this season. About 2,000 cases were offered to shipping companies, but suitable freight was not available. The only steamer sailing about the time when fruit was ready was the s.s. *Somerset*, but our Victorian friends, probably as a result of the previous success of this State in inaugurating the export of this variety of pear, had secured all her vacant space in advance. They shipped several thousand cases, and a recent cable conveyed the news that the fruit arrived in excellent condition and realised from 10s. to 16s. per case. At the time of shipment this class of fruit was selling in Melbourne at about 2s. per case. Although South Australian fruitgrowers were prevented from participating in this consignment, it is gratifying to learn once more that with careful attention prior to loading, and an even temperature on the voyage, Duchess pears can be successfully shipped from Australia to London. No doubt this certainty will stimulate growers to renewed efforts next year.



THE WHEAT MARKET.

The price of wheat on trucks at Port Adelaide declined generally during March. There was a temporary improvement after the middle of the month, but in the early days of April buyers were only offering 3s. per bushel, the lowest figure which has been quoted since June of last year, when the price stood at 3s. for a few days, but rose soon afterwards to about 4s. As will be seen by the extracts below. European authorities do not look for any very speedy recovery of tone in the market, owing to the large shipments from Russia, India, and the Danubian ports. On the other hand, the harvest in Argentina was a failure through drought, and the American exports have been considerably below the average of recent years.

Under date of February 17th *Beerbohm's Evening Corn Trade List* says - "The general demand, both for the U.K. and Continent, continues very moderate, being confined principally to purchases for immediate requirements, and there is every indication of buyers continuing a cautious policy until some idea can be formed as to how the winter wheat crop in the United States and Europe has come through the winter. If there are fair prospects in the spring of another large world's crop following those of 1909 and 1910, the present level of prices will probably be very difficult to maintain, but any serious mishap to the American or the French wheat crop would alter the position, although it must not be forgotten that Russia is the country which has dominated to a very great extent the market during the past two seasons. If conditions have so altered in that country that the large yields of 1909 and 1910 are to be considered as likely, with average agricultural conditions, to be repeated in the future, then it will have to be admitted that, for a time at least, the production of wheat promises to increase at a greater rate than the consumptive requirements. Last year, for instance, leaving Russia out of the question, against full to over-average crops in Roumania, India, Austria Hungary, and Australia, there were poor to bad crops in France, Argentina, America, and Canada (considering the large area sown), and Italy, and under average crops in the U.K. and some of the smaller European countries. It is claimed that the very large Russian crops of the last two years was owing simply to increased acreage and higher farming, and not to any exceptionally favorable weather conditions; but this will hardly be accepted as a fact at present, and the results of the next few crops will therefore be awaited with great interest."

Discussing the wheat position on March 3rd, *Beerbohm* writes - "There can be no doubt, provided the official estimates of the last two wheat crops were correct, that North America has a large quantity of wheat over and above the home requirements, and it is therefore quite possible, provided nothing serious happens to the crop now growing, that the exports from the United States during the next few months may be larger than previously expected; the wheat is believed to be in the country, but it remains to be seen whether farmers will be satisfied with the prices obtainable. . . . The question of price will no doubt depend, to some extent, on the prospects, as the season progresses, for the next crop."

Date.	LONDON (Previous Day).	ADELAIDE.	MELBOURNE.	SYDNEY.
	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.
March 8	Feb.-March 4 2; Dec.-Jan. 4 1½	3 1	3 3½ ex store	3 2
9	Firmly held	Do.	3 4 ex store	3 2 to 3 3
10	Quiet	Do.	3 4 and 3 2	—
11	Dull, with easier tendency ..	Do.	—	—
13	—	Do.	3 3½ to 3 3¾ parcel	3 2 to 3 3
14	Steady	3 2	3 4 and 3 2	3 3½
15	March-April 4 2½	Do.	3 4½ ex store ..	3 4
16	Easier	Do.	3 4 to 3 4½	3 2 to 3 4½
17	March-April 4 3½	Do.	3 4½ to 3 5	3 2½ to 3 4½
18	Steady, quiet	3 3	—	—
20	—	Do.	3 5 ex store	3 2 to 3 2½
21	March-April (Liverpool) 4 2½	Do.	3 4½ to 3 5	3 3½
22	Dec.-Jan 4 4½	Do.	3 5 to 3 5½ ex store	Do.
23	Quiet, easier tendency ..	Do.	3 5 to 3 5½	3 4½ to 3 5½ b.
24	Dull	Do.	3 5	Do.
25	Do.	3 2	—	—
27	—	Do.	3 3½ to 3 4	3 3½ to 3 6 b.
28	Steady, quiet	Do.	3 4 to 3 4½	3 3½
29	Off coast 4 3½	Do.	Do.	3 3½ to 3 4½ b.
30	Very dull	3 1	3 3½ to 3 4½	3 2½ to 3 4 b.
31	Dull, with easier tendency ..	Do.	3 3½ to 3 4	—
April 1	Dull	Do.	Do.	—
3	—	Do.	3 3½	3 2 to 3 4 b.
4	Weak, downward tendency ..	Do.	Do.	3 1 to 3 3½
5	To arrive, 4	Do.	Do.	—
6	Steadier, but inactive ..	3 2	Do.	3 1 to 3 2
7	Apr.-May 4 0¼ (Liverpool) ..	Do.	3 4 to 3 4½	3 1 to 3 2

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom—Continent, rates nominally at 24s. per ton (7½d. per bush). Parcels Port Adelaide to London, Liverpool, or Continent, 23s. 9d. per ton (7½d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush).

SAILER FREIGHTS.—From South Australia to United Kingdom—Continent, the market rate is 24s. to 25s. per ton (7½d. to 8d. per bush.); to South Africa, 20s. per ton (6½d. per bush).

AGRICULTURAL BUREAU.

CONFERENCE AT WHYTE-YARCOWIE.

The Nineteenth Annual Conference of the Northern Branches of the Agricultural Bureau was held at Whyte-Yarcowie on Tuesday, March 14th. Representatives of the Department of Agriculture present were—Professor Lowrie, M.A., B.Sc. (Director), and Mr. A. E. V. Richardson, M.A., B.Sc. (Agric.), Assistant Director. Members of the Advisory Board of Agriculture—Messrs. A. M. Dawkins, C. J. Tuckwell, C. Willcox, and G. Jeffrey. The following were delegates from the various Branches of the Bureau, viz. :—Whyte-Yarcowie—Messrs. F. H. Lock, J. Walsh, P. Robinson, M. Walsh, R. Ward, K. P. Sawers, H. M. Pascoe, G. D. Mudge, J. McLeod, J. E. and W. Hunt, A. Mitchell, E. M. Jenkins, G. F. Jenkins (Hon. Sec.), and the Hon. T. Pascoe, M.L.C.; Port Pirie—W. Munday; Yongala Vale—T. H. Battersby, F. Lloyd; Saddleworth—F. Coleman; Crystal Brook—H. Billingham.

The Chairman (Mr. F. H. Lock), on behalf of the local Branch, extended a hearty welcome to the delegates from other branches, to members of the Advisory Board, and representatives of the Department of Agriculture. He specially desired to welcome Professor Lowrie on his return to South Australia. All the farmers in the State viewed with the utmost satisfaction his appointment to the position of Director of Agriculture. He asked the Professor to open the Conference.

OPENING ADDRESS.

Professor Lowrie thanked the Chairman for his expressions of welcome. For more reasons than one he was glad to be again working in South Australia. One reason was the existence of the institution represented by that gathering. Only after a man had worked elsewhere was he able to fully appreciate all that had been done by the Agricultural Bureau and its Branches for the advancement of agriculture in the Central State. The meeting together of the producers and the exchange of experiences and opinions was one of the best means of awakening an attitude of close observation and of increasing knowledge. There was no doubt that the Bureaus had been largely responsible for the pleasing progress recorded during the last 10 or 15 years. Besides disseminating useful information they had aroused a spirit of healthy rivalry

among the farmers and a desire to do things well, which, after all, was one of the best motives and invariably proved one of the most profitable factors in application. Still another commendable feature of the Bureaus—which he hoped would be long maintained and continue to grow in usefulness—was that they enabled the department to ascertain what was most needed, and furnished an avenue for getting into touch with the agriculturists which no other agency offered. Another reason he was glad to be back was that the department possessed a particularly strong staff of young, able, and enthusiastic men, who had done good work and would do still more. The co-operation of such a staff was most encouraging, and presented an opportunity for successful achievement which he viewed with keen satisfaction. The progress witnessed in South Australia in recent years struck one forcefully after having been absent for an extended period, and he felt confident that the limit had not yet been reached. Larger yields would be obtained even from the land now held as arable. The position of the farmer to-day was vastly different from what it was 10 or 20 years ago. When he came to the State 23 years since there was an anxious look, begotten by bank overdrafts, on the faces of many men, but that had practically disappeared. The change, no doubt, had been due in a measure to the good prices which had ruled and the heavier rainfall—the records showed a $3\frac{1}{2}$ in. better average during the last 10 years than for the preceding decade—but in addition there had been a big improvement in the methods adopted. Although less favorable seasons would probably return, the losses and disappointment would never again be so bad as they were when he first worked in South Australia for this reason. The other States were keen on getting South Australian men, and he had noticed in Western Australia that where there was a South Australian farmer under pioneering conditions he was a leader. The farm laborers also were much desired, because they were accustomed to working in the most economical way.

Draught Horses.—He was of the opinion that sufficient attention was not being paid by the farmers generally to the breeding of draught horses. Thousands of pounds worth of horses were being landed in Western Australia, and in the future they would be required in shiploads in that State, but at present very few came from South Australia. It had been demonstrated that first-class light and draught stock could be raised here, and although the present standard of the latter could be improved, there was little room to criticise the former. He was not going to suggest that farmers should establish expensive studs; but it was highly desirable and practicable that there should be formed, perhaps through the medium of the Agricultural Bureau, what might be called horse societies, similar to those which obtained among the Scottish farmers. Those organisations required their members to pay a certain subscription, and selected a committee to attend the stallion shows and offer a premium of (say) £150 for a suitable horse to serve not

more than a stated number of mares at a fixed price for each. The owner of the stallion in that way received a premium, and had his fees for the season guaranteed, and the farmers reaped the benefit of a first-class horse travelling exclusively in their district, and serving their mares without the expense incidental to the maintenance of a stallion. In that manner and by the selection of the best mares for service the standard of the horses was steadily improved. He was convinced that a big opening offered for breeding the best types of draught horses, which were exceedingly good property and likely to continue so.

Sheep on the Farm.—As many present would remember, when in South Australia formerly he had battled hard to awaken a better appreciation of sheep on the farm. The shipments of lambs had gone up to over 200,000; but he thought the number before long should reach half a million. There was good profit in the business. Many people had an idea that wheat-growing was interfered with by keeping sheep. His contention was that sheep would be one of the means of increasing the cereal yield, and indirectly a happy source of adding to the financial returns. Farmers might well pay more attention to stock generally. There was not much in the mere mechanical work of wheat-growing, and as a rule it was not until one began to get good stock that real live interest was aroused in the operations of the farm. A nice little flock of crossbred ewes was most desirable, and along the line of wool and mutton raising progress could be made a long way with marked advantage to the whole community.

Regarding methods of working the land, these must be determined in the terms of the rainfall—not only to eke out the moisture for the crop from one season to another, but because, if sufficient moisture could be conserved, forms of activity would work for the farmer in fertilising his soil. With a bacteriologist at work, the selection of seed in practice, and the breeding of wheats going on, and other agencies helping, the output of South Australia should be continually increasing.

FARM STOCK.

The following paper on "Farm Stock" was read by Mr. H. M. Pascoe:—
"In many great industries the most essential feature of success is the proper utilisation of by-products. This is particularly noticeable in the meat industry, which could not be profitably carried on but for that. The sooner farmers realise the importance of the by-products on the farm, under the heading of which we can place farm stock, the better their financial position will be. Successful farmers will generally acknowledge the important part that their live stock have played. The farmer cannot possibly exercise too much care in the selection and breeding of his horses. This applies more particularly at the present time, with such extraordinarily high prices ruling for this class of stock, and, indeed, these high prices are likely to continue for many years

to come. Every farmer should breed as many horses as possible, as buying them at present prices is ruinous, and one need have no fear of breeding too many. The man who has a surplus supply of good horses to-day is better off than the man with a good crop of wheat, as one good young draught, at two years old has a market value equal to 100 bags of wheat. Considered in this light, horse-breeding as a business proposition would be hard to beat. The farmer has a big advantage over a horse-breeder pure and simple, in that his mares are not idle during the year, but are used in producing his crops. The very high prices ruling for horses, instead of being a continual nightmare to farmers, might easily be turned to advantage, and make the farm horses one of the best sources of revenue. In breeding, it pays, undoubtedly, to use good mares, and to be very careful to secure the services of the best stallion. The statement that a cheap horse will do just as much work as the better one is not a fact. We can obtain a young medium draught mare of a certain class for from £30 to £35, or we can obtain a good class of young draught mare for from £40 to £45. The cheaper one will do almost as much work as the more expensive one in the team, but the £40 to £45 mare will make up almost the whole of the extra £15 originally paid for her in the difference between the selling value of her first foal and that of the other mare's foal. After that, for every foal that those two mares rear the superior one is producing about £12 more than the other. The mare at £45 is, in the long run, far more profitable than the inferior one. I have noticed in the *Journal* that quite a number of members of other Branches favor breeding from fillies when they are two years old. I personally think this a mistake, as at that age they have not nearly finished growing, and such a practice must have a detrimental effect on their growth. Many farmers now break in their colts at two years old. If this is done they should not be overworked before they have finished growing and become set. At that age heavy lifting might easily strain them so seriously that they would be ruined before their working life had really begun. Nothing can be said against handling a colt as young as anyone cares to, as while they are young they are usually more tractable and not so likely to knock themselves about; but putting them to regular heavy work is a different matter. The sheep industry in South Australia always has been and is always likely to be one of the most important factors in the farmer's prosperity. Particularly is this noticeable where agriculture is carried on in outside districts not blessed with a very regular rainfall. Where sheep are kept the returns do not vary with the seasons so much as do the crop returns. Here, again, the farmer should exercise proper care in careful selection and breeding, and he will be amply repaid for his trouble. It has been considered by many to be unwise to breed from either ewes or rams under four-tooth. Now, however, ewes are almost universally bred from two-tooths, and experience has long proved that it works all right, excepting in very cold, wet climates. They are not such good

mothers as older ewes, and require a little more attention at lambing time ; but if properly looked after they lamb very well, although the percentage is usually not so high as that obtained from older ewes. The old fallacy about using two-tooth rams has also been exploded, and in fat lamb raising it is a distinct advantage to use young rams, as their progeny mature much earlier than that of old rams and are also more uniform in size. As most farmers who keep sheep now go in principally for fat lamb raising, one of the first points for consideration is which ewe to keep for that purpose, the Merino or the Crossbred. There is a great deal to be said for each, and it is, I think, a matter which has largely to be determined by the locality. The Crossbreds are admittedly better mothers than the Merino, and in favored localities are more prolific, but they are not such good doers in poor country as Merinos. The general run of small farmers depend upon buying their ewes, but they can never be sure of obtaining a supply of Crossbred ewes on the market. Lambs from a Crossbred ewe mature a little earlier, and at a given age are a little more valuable as freezers than those obtained from the Merino ewes. On the other hand, the extra value of the Merino ewe's fleece will more than make up the difference ; consequently, I think that farmers in most districts, even if raising freezers is their object, cannot do better than stick to the large-framed, robust, Merino ewe. Experience has proved that the Shropshire or Dorset Horn ram is most adapted for breeding freezers in South Australia. The Shropshire is most generally used—not necessarily, I think, because of any superiority over the Dorset Horn, but chiefly because there are more of them in the country, and they are more easily obtained. There is, indeed, much to be said in favor of the Dorset Horn, and it is generally agreed that they are more prolific breeders than the Shropshires. Whatever breed of ram the farmer decides to use, the most important thing is to get a good one of that particular class. The cost will certainly be a little greater, but undoubtedly the profits that accrue will be proportionately larger. It is undoubtedly false economy to save 30s. or £2 in the price of a ram and have the quality of the lambs suffer in consequence. Situated as some of the members of our own Branch are, outside the line of rainfall, I think they would do well, even though they wish to sell a large proportion of their lambs, to keep entirely to the Merino. At five months or six months old they are not quite so valuable as the Crossbred, but there are other considerations. In the first place, lambing time is a very critical period of the year in this district, where there is not much shelter. Generally speaking, there is not too much feed about, and the weather is very cold ; consequently there are a good many losses with a flock of Merino ewes lambing to Shropshire rams, as the lambs are so big. In most seasons there is a certain percentage of lambs here, which are not good enough for freezers—culls, which have to be held over very often for another year. Unless you can fatten a Crossbred there is practically no sale for it, while

for a well-woolled Merino there is always a demand as long as it can travel. I am in favor of the farmer breeding his own ewes, whether his object be lamb-raising or wool-growing. Excepting perhaps in very favored localities, there are no sheep that will do as well in any country as those that are bred there, and this applies more particularly to some of the cold, open places in this district. The farmer who goes in for breeding his own ewes will probably for a year or two lose a certain percentage of his profits, but after that time he will realise a greater profit through having a flock of sheep that has been bred on the place, and is used to the particular climatic conditions obtaining in that district."

Mr. Willcox considered it was a mistake to break in draught horses before they were three years old. He would handle them as much as possible, tie them up occasionally, and try in every way to bring them up so that they would be comparatively easy to break later on. A mare should not be used for breeding before two and a half or three years old. If mated before this the result would probably be stunted stock and injured mothers. It was false economy to purchase any but the best live stock.

Mr. Battersby (Yongala Vale) said he had mated six mares last year, but only secured one foal, while this year seven mares had been mated and it was evident that there would be no result. This was a problem in farm stock which he considered very serious.

Mr. Walsh (Whyte-Yarcowie) considered four years the proper age for mating draught mares. If used for breeding earlier than this they must be exceedingly well fed to keep them growing. He considered the majority of travelling stallions were overworked, and thought the proposals made by Professor Lowrie would largely overcome the difficulty of poor foaling.

Mr. Munday (Port Pirie) considered the difficulty of obtaining foals was due to the heavy work mares were required to do. It was unwise to breed from mares before about four years old. He would break in horses as soon after two years as possible, feed them well, and give only light work till they were four years old. It paid to keep a limited number of sheep on most farms. He found that local conditions rendered the frozen lamb trade unprofitable to him, and therefore he always bred pure Merinos. The wool brought top price, and it was a paying proposition.

Mr. Jeffrey emphasised the advantages of procuring big sheep. Constitution was denoted by size, and a big carcass provided space for the wool to grow on. He would advise farmers to aim at the production of big sheep, with lengthy fleece as dense as could be. While big sheep stations existed, facilitating the production of the very best stock, farmers would do well to procure their ewes from these.

Mr. Jenkins considered it paid to buy ewes from stations for breeding lambs for freezers, as first-class sheep from a wool point of view were not necessary, and they could therefore be secured comparatively cheaply. It was more

profitable for a farmer to breed his own Merino ewes if he had to hold the lambs. There was no excuse for a farmer in South Australia to breed from inferior rams. He would breed from a mare at three years old and get an extra foal, rather than wait till she was four years of age.

VARIETIES OF WHEAT SUITABLE FOR SOUTH AUSTRALIA.

Mr. F. Coleman read an instructive paper on "Varieties of Wheat" to the following effect:—"Farmers are engaged in wheat-growing for a livelihood. A little wool and dairy produce helps, and an honorable employment it is, giving any amount of scope for the exercise of the brain as well as muscle. Our object is to secure good crops—a heavy yield of profitable wheat that will when sold—and I favor early selling—return a substantial profit over and above all the incidental expenses and risks necessarily incurred in this somewhat speculative pursuit. I take it that yield per acre is the first consideration with most of us, and the wheat that can be relied upon to give a good yield is the one we want for our main crop. A wheat that yields well under favorable conditions, but which may be liable to go down in rough weather, or shed its grain when barely ripe or directly it is ripe, that fails to resist red rust or bunt, ripens very irregularly, or has very fine thin heads that may pass through the comb of the stripper—such a wheat we sow very sparingly. But another factor beyond the yield should not be lost sight of, and that is the price. The local price is regulated by the world's wheat market in London. Our wheats are destined for the mill, and we cannot afford to neglect the miller's opinion. We are told that our wheats are deficient in flour strength and in gluten. Some of the wheat exhibits at the recent Royal Show in Adelaide were deplorably low in gluten, notably Yandilla King and Federation. The highest tested was an exhibit of Bobs. This was 100 per cent. better in gluten than the Yandilla King, though grown only a few hundred yards distant and on somewhat similar soil. A short growing period and quick ripening time, with probably slightly pinched grain, is favorable to high gluten content. Such a cool season as last, with slow maturity, is unfavorable. If in addition to yield per acre, by selection, or by crossing new and stronger blood into our wheats, we can increase their flour strength and gluten content we shall accomplish much; for it is recognised that the nation that is fed on a wheat containing a high percentage of gluten, provided it is palatable and digestible, will make a people of higher mental and physical standard than one fed on poorer quality. Unfortunately, quality and quantity are by no means synonymous terms when applied to wheat crops. Our strongest-floured wheats—such as Comeback and Bobs—have not proved profitable to grow generally throughout this State. Again, a heavy crop, such as might be expected from strong, rich land, will not give such high *quality* as is obtained from a much lighter yield on poorer sandy loam. Selection is the best way for the farmer to improve the yielding

character of his wheat. By sowing in small plots the best grains from the finest heads selected from the best plants, true to type, we shall certainly improve the yield per acre of our wheat. The increase in flour strength and in gluten is a much more intricate business, and, important as it certainly is, must, I think, be left largely to our wheat experimentalist, miller, and agricultural chemist, who by such perseverance, patience, and experience as can hardly be expected of the farmer, can help us to introduce greater quality into the wheats which we may have by continuous care in selection proved to be highly profitable for our district and farm. I should like to pay a tribute to the admirable work done by our wheat-breeders—by Mr. Richard Marshall in this State, and by the late William Farrer, one of the finest men in New South Wales, and one who has probably done more for the wheat-growers of Australia than any other individual. Among eight new varieties of his wheat received in 1901 were Federation, Bobs, Plover, and Jonathan. Sixty-four grains only of each were sown, each grain being dibbled in 7in. apart in drills 14in. apart to allow each plant to develop and leave room to get between to examine the plants. Mr. Farrer published the results of that year's trial in the *Agricultural Gazette of New South Wales* for April, 1902. Federation came out top, with a yield per acre of $30\frac{1}{2}$ bush., showing 7 per cent. of red rust—for that was a rusty year; Bobs secured $28\frac{3}{4}$ bush. per acre, practically free from rust, only showing a tenth of 1 per cent.; while Outpost, containing three-quarters of Steinwedel blood, was so rusty that Mr. Farrer discarded it. I have referred to the percentage of red rust (according to a scale published that year by Dr. Cobb) on Federation and Bobs. Dart's Imperial and Purple Straw were very rusty, and Rattling Jack rotten with it. Bobs, when first introduced, was thought to be practically rust-proof, but is now acknowledged in New South Wales to be liable to red rust. The same may be said of Yandilla King. Three years ago my crop of this wheat was too rusty to grade for seed. When cleaned it only weighed 59½ lbs. to the bushel, yet the crop averaged 23 bush. per acre. The last two years the grain has been plump and good, the same strain being used for the past seven years.

"Federation is to-day I believe the most popular wheat in South Australia, as it is in New South Wales and Victoria. It has gained its remarkable popularity because of the number of bags per acre it will return. It puts its strength into producing grain, not wasting any in growing straw, and represents a successful attempt to obtain a wheat suited to our Australian harvesting methods. This wheat is liable to rust, bunt, and flag smut.

"Yandilla King, Federation's half-sister, I place second. This wheat, in the Upper Gilbert Valley, pushes Federation very close for first place on the better land; a wheat that often does not start well, but comes on wonderfully later in the spring; holds its grain very tight, but in rough weather tends to go down, when the relatively large first knot often gives trouble

by causing chokes in the comb of the stripper. The grain is large and plump. These two wheats have given the best returns on my farm during the past seven years. Though I have been experimenting with over 80 varieties, including 36 of Farrer's new wheats, I have yet to find a wheat that under varying conditions of soil and season can be relied upon to give as good an average crop as Federation and Yandilla King.

" *Bunyip* I first grew in 1902, but did not continue with it very long. As an early wheat, two weeks before Steinwedel, it has lately come to the front again. I am trying it again.

" *Firbank*, a half-sister to Bunyip, was the earliest wheat I grew last year; it held its grain too loosely and shook out badly. These two are Farrer wheats.

" *Viking*, one of Mr. Jos. King's selection, is early, but has the common failing of most early wheats—a tendency to go down.

" *King's Early, White and Red*, improved by selection at Roseworthy, do excellently there. On my farm they are too much inclined to lodge. For hay they are good, giving heavy crops with excellent color.

" *Comeback*.—Medium, early, strong-floured wheat, equal to the old noted Fife, or Manitoban. Only a fair yielder.

" *Bobs*.—Midseason, high flour strength, and good percentage of gluten. The champion milling wheat in New South Wales, where it seems to yield better than with us. Described by Major Norton as 'the finest wheat in the world.' Mr. Farrer's triumph as a wheat-breeder. The yield, however, needs improving.

" *John Brown* gives a good crop of hay—good length, color, and flag. The local bakers highly appreciated flour milled in Saddleworth from this wheat.

" *Tarragon* is late, but under favorable conditions has proved a good cropper. Its flour makes a fine white bulky loaf.

" *Jade, Florence, Genoa, Warren, and Cedar* I have not grown more than two seasons, and consider further trial desirable before passing judgment. Florence shook out rather badly last season. Its full sister, Genoa, is much later, and these two wheats and Cedar are reputed to be smut (bunt) proof. In one of Mr. G. F. Berthoud's (Wheat Experimentalist of West Australia) wheats, viz., Crossbred No. 53A, we have a promising variety new to this State. His Zealand, a much older production, is a good hay wheat. The above-mentioned wheats I have grown on my farm. Among others of which I cannot speak from practical knowledge I think Bayah and Improved Dart's Imperial well worth trying, and intend testing them this year. While Yandilla King has been my favorite variety of Mr. Marshall's wheats, it may be that his No. 3 or Silver King—purple and white straw varieties of the same wheat—Triumph, or Improved Dart's Imperial may prove better in some districts.

" Hay Wheats.—Among hay wheats the Medeah class, including Indian Runner and Le Huguenot, give great yields, due to their solid straw, while White Tuscan, White Essex, White Lammars, and Baroota Wonder have had great reputation in the past.

" I advise farmers to try a few new varieties in small hand plots, selecting what appear to be the best and most suitable to local conditions. Then, by continuous selection, raise each year a stud plot from which seed is obtained for the main crop. I favor selection for the farmer in preference to cross-breeding. Of the thousands that Farrer, Berthoud, Pye, Marshall, and others have raised by cross-breeding, hardly a score are in general cultivation. At the same time there is a great interest in cross-breeding. I have some of my own varieties that I shall watch with great interest, notably crosses of Federation and Yandilla King, and Federation and Bobs. and it may be from these something better than either parent may result. Having regard to the various conditions in South Australia I should place the principal varieties as follows :—

" For Dry and Hot Districts.—Early and midseason planting, John Brown, Marshall's No. 3, Yandilla King, and Zealand for hay. Midseason and late planting, Federation, Bunyip, Firlbank.

" Varieties for Medium Dry and Hot Districts.—Early and midseason planting, Yandilla King, Marshall's No. 3, Crossbred No. 53, Improved Dart's Imperial. Mid-season and late planting, Federation, Bobs, Bunyip, Firlbank, and Comeback, World's Champion.

" Varieties for Cool Districts.—Early and midseason planting, Crossbred 53, Improved Dart's Imperial. Midseason and late planting, Bobs, Federation, Comeback, and Cedar."

Mr. Dawkins, in discussing the question, said that if wheat had been grown on the same lines as stock, with constant selection going on, there would have been no need to introduce the many new varieties which had displaced the old. A few years ago such a season as the last would have worked havoc in the crops through red rust. The introduction of phosphates, which caused the wheats to grow more quickly and reduced the period of danger from rust, and the selection of varieties which resisted or escaped through maturing early, accounted for the comparatively small losses from this cause. The best hay wheat he thought was White Tuscan, while in mallee country King's Early did well. Federation was not a success with him.

The Hon. T. Pascoe, M.L.C., said that many late varieties were subject to red rust. Purple Straw and Goldsmith were among the best yielding wheats in dry country. A similar season to last would have brought disaster to South Australia 12 years ago. He did not think that Marshall's No. 3 was a suitable wheat for a dry district. Other farmers in this locality had proved it to be unsatisfactory. Federation always took first place in regard to the

yield. There was a difficulty of getting pure seed, however, but this was being overcome by the establishment of Government seed wheat farms.

Mr. Richardson said that while South Australian wheats were wanting in gluten and strength they were of an excellent color. It was generally believed that gluten and strength were largely determined by the climate, and depended a good deal upon the rapidity of ripening. As an experiment, six varieties of wheat were sent to each State to be grown for the department, and to return samples. In two years out of three the wheats grown in New South Wales were stronger than those grown in any of the other States, while those grown in New Zealand were weakest of all. Federation was liable to red rust and flag smut, and last year was badly affected with takeall. A drawback of John Brown was that the first five or six spikelets were barren. Bunyip was considered to be a splendid wheat in Victoria and New South Wales. Cedar he would not recommend under any circumstances; it had a peculiarly shaped head. Firbank was liable to flag smut, and it also shelled freely.

Professor Lowrie said the milling qualities of wheats very largely depended upon the climate and soil where grown. The Russian wheats, for instance, were grown by farmers of the lowest type, who secured the lowest yields, and yet the grain they produced was the best in the world. Millers would have a white wheat, and farmers must not lose sight of the fact that the best wheat for them to grow was that which returned most money. The South Australian wheats were sought after in London to blend with other flour to secure a good color. The American wheats had to be improved in color, and so there was always a good demand for Australian wheats. It would be bad policy to discourage this demand. The important matter was to obtain high yielding varieties. In some cases 3d. per bushel above market prices had been offered for certain varieties of grain, but the comparatively low yield made it less profitable for farmers to grow them. Bunyip was a good wheat for a 13in. to 15in. rainfall. Other good varieties were Alfa, Baroota Wonder, Comeback, and Crossbred 53. Alfa was a rapid grower, but came into ear before danger of frost was past.

IMPROVEMENT OF WHEAT.

The Assistant Director (Mr. Richardson) delivered an address on the question of "Improvement of Wheat." At the outset Mr. Richardson spoke of the magnitude of the wheat-growing industry, and said that new fields were being thrown open for farming and the demand for land was greater than ever before. At various times enhanced prices had been offered for Comeback ranging from 10d. to 2d. per bushel above the market rates. To-day, however, no higher figure was given for this variety, therefore the farmer would naturally grow those wheats which gave the heaviest yields. It was within the power of the farmer to increase the yielding capacity of certain varieties

by selection. Cross-breeding was a more intricate matter, and it was probable that for progress in this direction we must rely upon the wheatbreeder. [For Mr. Richardson's views concerning selection see pages 377-385 November, 1910, issue.—Ed.]

Cross-breeding.—Continuing, Mr. Richardson said it must be remembered that the improvements made by selection only continued to exist so long as the same care was given to the maintenance of the good qualities as was given to their making, and under ordinary farming conditions the improvements speedily disappeared. Cross-breeding between the selected varieties of different types, and selecting and fixing from the greatly varying progeny which result from such crosses was the method followed at wheat-breeding stations. Mr. Richardson then showed by means of diagrams the process of cross-breeding.

General Results.—When two varieties of wheat differing considerably from one another were crossed very interesting results were obtained, he said. The progeny of the first generation were intermediate in character to the two parents. Thus, by crossing Medeah on Silver King the crossbred progeny resembled both Medeah and Silver King, having the structure of the Silver King head, the black beard of the Medeah, whilst the straw was coarser and heavier than Silver King, yet not so coarse and heavy as Medeah. In the second generation the seeds when planted produced plants which differed very widely. Some were bald; some heavily bearded; some had heavy straw and flag; others, again, had light straw; some were tall; some dwarfed; some had grain of a Macaroni type; and others had grain of the ordinary bread wheats. There was every conceivable combination and gradation of qualities from the male plant—Medeah—on the one hand, and the female plant—Silver King—on the other. Each plant of this generation might be regarded as the first member of a new variety. Here the wheat-improver needed great judgment and insight to select those types which were most likely to prove of special value. Mr. Richardson then spoke of the new wheats produced by Farrer, and the various fruits, &c., produced by Burbank in cross-breeding. In conclusion, he said improvement could therefore be brought about in two general ways, viz., by selection and cross-breeding. Selection was within the reach of everyone, and by continuous, systematic, and rational selection it was possible to achieve a great deal in the improvement of *quality* and *prolificacy*. Cross-breeding required more careful work. It was not likely to be used by many farmers; but to those who had a taste and a natural bent for the work a great deal of pleasure, instruction, and probably some profit would accrue. It required time, insight, judgment, and a considerable amount of patience, and no man could place any limit to the possibilities which lay ahead of the work.

The Hon. T. Pascoe said he was hopeful that Australian experts would succeed in producing varieties suitable for dry districts.

Mr. Jenkins mentioned that on one occasion he took a load of Comeback wheat to a miller, who put it aside for its better milling qualities but did not pay him anything extra. Set rules were not always applicable in the district, for in dry years of the past, when early wheats were recommended, Dart's Imperial, except when affected by rust, was the best and heaviest yielder. He thought it wisest to grow several varieties so that "his eggs would not all be in one basket."

Mr. Coleman thought farmers could accomplish much useful work in selecting varieties of wheats most suitable to their own farms and districts.

Mr. Richardson, in reply, pointed out that droughty seasons gave the farmers a grand opportunity for the natural selection of drought and disease resistant varieties. He also explained at some length how on Mendel's Law the crossbreeder could determine which productions could be fixed, and recommended farmers who had produced new varieties by cross-breeding to retain any desirable wheats which grew true to type for three successive years. The extra length of head noticeable in crossbred wheats was the result of stimulus given by the cross, but after a few years the normal size was again reached.

Professor Lowrie, dealing with the practice of sowing early wheats late and late wheats early, said certain of the early wheats were inclined to become weaker in constitution in cold districts. In a district a fair height above sea level, such as Yarcowie, a good hardy wheat, like Dart's Imperial, if early enough to escape frosts, might be the ideal one. The Wandearah district had produced some excellent varieties, such as Carmichael's Eclipse and Baroota Wonder, but they were not so good in the higher districts, because they had not the hardiness of constitution desirable there. A good hardy slow-stooling variety was best for cold country. On general principles he advised sowing early wheats late and late wheats early.

NEXT CONFERENCE.

Considerable discussion took place concerning the best centre in which to hold the Conference. Mr. Jenkins said that the White Yarcowie Branch always sent delegates to the Northern Conference, no matter how difficult it was to reach the place of meeting. He was exceedingly disappointed that so many Branches had not only not sent representatives, but had failed to reply to his letter. This lack of courtesy he could not understand.

Delegates from several Branches spoke in a similar strain, and it was the general opinion that all Branches should be sufficiently loyal to the Agricultural Bureau to send delegates to Conferences, or at least to let the Secretary know if it was impossible. It was finally resolved to hold the next Conference at Crystal Brook.

FREE PARLIAMENT.

The evening session took the form of a free parliament.

TAKEALL.

Mr. Dawkins said that some of the crops which seemed best of all up to the hay harvest had then revealed the presence of takeall. As the result of his experience and observation he had come to the conclusion that it was a mistake to plough when the soil was dry. The seed bed must be firm, and, if necessary, a roller should be employed to make it so. He made it a practice to grow oats wherever takeall appeared, and used every means of destroying barley grass and other plants which acted as a host to the fungus.

Mr. Billinghamurst said he had been assured that the takeall fungus had been found on oats, and another delegate said some of his oats had been attacked.

Messrs. Jenkins, Munday, and Coleman quoted instances in which great damage had been done to wheat crops by takeall, while both wild and cultivated oats adjacent had been quite immune.

Mr. Richardson said that a very thorough examination of the crops in the Crystal Brook district, when some of them were so badly affected with takeall last season, had only confirmed his opinion that oats were not subject to the fungus *Ophiobolus graminis*. It was to be regretted that statements to the contrary were made without any attempt having been made to verify the assumption. Statements of that kind ought to be backed up by the highest authority. Even if the fungus were discovered on the oat plant, that in itself would not be conclusive evidence that the oats were liable to the disease. Absolute proof could be obtained only by isolating the fungus and then infecting clean oats. Someone may have seen oats attacked by the disease, but he should give the department a chance to prove or disprove it. He had sent some hundreds of specimens to Mr. McAlpine (Vegetable Pathologist of Victoria), who had proved the trouble in the Crystal Brook district was takeall, but it had yet to be proved that oats were subject to it.

Professor Lowrie said the experience of farmers went to show that if not absolutely immune to the disease, oats were undoubtedly the best preventive. In answer to a question as to why the losses from takeall were greater in wet years, he thought possibly it might be partly due to the fact that in a wet season the fallows were not worked until late, and such plants as barley-grass, speargrass, &c., acted as hosts to the fungus until the wheat was attacked. In drier years the fallows were kept free from these weeds. In wet years, too, the soakage of water would probably be a means of spreading the fungus spores over a much wider area, and so increase the infection. He had a suspicion that certain oats under certain conditions acted as hosts, but at the same time a lot of diseases were called "takeall," which were

not caused by the fungus associated with that term. If farmers would fallow early—keep down weeds likely to act as hosts, avoid working the soil when it was dry, and grow oats where the disease was found, he believed the trouble would disappear.

PICKLING SEED WHEAT.

In reply to a question as to what solution was best to use as a preventive of bunt, Mr. Richardson briefly outlined the results of experiments he had conducted at Parafield. He found the best strength to use bluestone was 1½lbs. to 2lbs. of bluestone to 10galls. water. This pickle, however, killed a large percentage of seed and delayed the germination of the rest. This was a great disadvantage, as a day or two's delay in getting a start sometimes meant bushels at harvest time. Formalin was an excellent pickle. Used at the rate of 1 part in 500, it only killed about 5 per cent. of the grains. Unfortunately, purchasers could not be sure that they were getting formalin pure. This would need to be attended to in a Fungicides Act. Although it had been claimed that formalin was a preventive of loose smut and flag smut, this had not been the case at Parafield. The whole of the seed had been treated with this pickle, but both the wheat diseases noted were found in the crop. A third preparation was fungusine. This did not interfere with the germination, and the crop was very clean. Regarding the time of sowing after pickling, it seemed that the sooner the seed was sown after using bluestone and formalin the better. With fungusine it apparently made no difference when the seed was sown.

Mr. Coleman said he had used fungusine on seed for 400 acres. The crop was not quite free from smut, but the germination was much better than when bluestone was used.

Mr. Jenkins had not such a clean crop with fungusine pickle as with bluestone. He therefore intended to keep to the latter.

Professor Lowrie, in reply to a question, said that if lime was used at all in pickling it was very difficult to get the seed through the drill. Self-sown crops were usually free from smut, because there was usually sufficient moisture in the soil to cause the spores of the fungus to germinate before there was enough to cause the grain to germinate; consequently the fungus perished for lack of a host. Similarly when farmers sowed in very dry soil the fungus spores germinated and died. He thought Mr. Jenkins should not be satisfied with bluestone as a pickle. If formalin of a proper strength could be obtained it would be much better than the bluestone. He had tested the result of sowing each week from May 10th to 30th, and found as much as 2bush. per acre higher yield from the earlier sown plots. This showed the value of a pickle which did not delay germination.

VETERINARY SURGEONS AND THE STOCK DEPARTMENT.

Mr. Billinghamurst referred to the losses sustained by farmers through their inability to secure the services of qualified veterinary surgeons in time of need, and moved—"That it be a recommendation to the Advisory Board to urge upon the Government the necessity for appointing veterinary surgeons to various centres throughout the State."

Mr. M. Walsh contended that competent veterinary surgeons should be placed where they would be more accessible to the farmers. At present there were too many quacks in the country.

Mr. G. Jeffrey submitted that the Government veterinary surgeons should be under the control of the Minister of Agriculture.

Mr. G. F. Jenkins thought the farming community would be quite prepared to pay for the services of the officers when they had the benefit of them.

Mr. F. Coleman said that under existing conditions it was utterly impossible for Messrs. McEachran and Loxton to respond to all the calls made upon them.

Professor Lowrie spoke of the value of courses of instruction in elementary veterinary science. It would be his aim to have a series of lectures delivered in different centres, and, if possible, he would like one of the subjects to be veterinary science.

Mr. Billinghamurst moved—"That it be a further recommendation to the Advisory Board to advise the Government that the best interests of the stockowners would be served by the Veterinary Department being placed under the Minister of Agriculture."

Both resolutions were carried.

BANQUET.

At the close of the Conference delegates and visitors were entertained by the Whyte-Yarcowie Branch at a banquet. Several toasts were honored, and Professor Lowrie in replying to the toast of "Departmental Experts" said he was happy to see that healthy relationship existed between the farmers engaged in the active productive operations and the officers paid to help them by throwing light upon their problems and expediting their work, and this would undoubtedly react to the good of the community generally. When, as had happened that afternoon, he saw a body of farmers listening eagerly to a discussion on Mendel's Law—one of the latest results of biological research work, and really a matter of pure science and almost demanding more—it satisfied him that there was a glorious opportunity for the departmental experts to accomplish much for the rural industry. The circumstance encouraged him greatly, and had awakened a thought that the department must take the opportunity to keep that interest going, and supply those who desired to be satisfied with further knowledge. He felt confident that lecture courses would be well received, and that the farmers would await patiently the results of any research work which might have to be undertaken.

by the department in the knowledge that a man must labor for some years, and frequently then be unable to show much for his investigations.

Investigating Diseases. — If the department had a weak spot it was the absence of pure science research. They needed a pathologist or bacteriologist badly. To properly inquire into diseases such as takeall a man must be at his laboratory table uninterruptedly for a considerable time. The officers in the field could feed him with work, and with the results obtained endeavor to educate the farmers to a full appreciation of the value of the researches. The gratifying increase in the prosperity of the agriculturists was largely due to better and more intelligent methods, but there was still a long way to go before the results of the many would approximate those of the few. In every district pretty well he could put his finger upon half a dozen men who were 30 per cent. about the average for that locality, and his aim would be to bring up the others to that level. If that could be accomplished the gain would be immense. The farmers had done well. They were ahead of the other States. Go on, he advised, and do better. He would take advantage of every opportunity to foregather with them, collect practical hints from their discussions, generalise them, and send them back to the multitudes of producers.

EXHIBITS.

An attractive display of wheat, almonds, fruit, and vegetables was arranged in the hall. The excellence of the garden produce was quite a revelation to many of the visitors, and showed that some very good gardens were in the vicinity.



HERD OF WHITE CATTLE.

RAINFALL TABLE.

The following table shows the rainfall for March, 1911, at the undermentioned stations, also the average total rainfall for the first three months in the year, and the total for the three months of 1911 and 1910 respectively:—

Station.	For March, 1911.	A'v'ge. to end March.	To end March, 1911.	To end March, 1910.	Station.	For March, 1911.	A'v'ge. to end March.	To end March, 1911.	To end March, 1910.
Adelaide	0.88	2.52	2.35	4.18	Hamley Bridge	0.44	2.20	2.56	5.11
Hawker	1.03	1.59	1.35	3.92	Kapunda	0.83	2.52	3.41	5.46
Cradock	0.24	1.78	1.01	3.73	Freeling	0.79	2.17	3.65	5.40
Wiloon.	0.39	1.74	0.62	4.71	Stockwell ...	0.75	2.15	3.78	4.49
Gordon	0.35	1.76	1.42	2.78	Nuriootpa ...	0.54	2.35	2.54	4.55
Quorn	0.64	1.64	1.06	2.59	Angaston ...	0.72	2.29	3.73	5.26
Port Augusta	0.64	1.75	1.48	2.55	Tanunda	0.81	2.50	4.12	3.96
Port Germein	0.50	1.73	2.79	3.84	Lyndoch	0.82	2.20	2.22	3.79
Port Pirie ...	0.73	1.77	3.19	5.25	Mallala	0.35	2.18	1.92	4.12
Crystal Brook	0.81	1.81	2.92	4.38	Roseworthy .	0.56	2.11	2.33	5.87
Pt. Broughton	0.90	1.79	4.11	3.21	Gawler.	0.64	2.40	2.28	4.33
Bute	1.30	1.74	3.48	3.40	Smithfield ...	0.98	2.41	2.56	5.27
Hammond ...	0.54	1.70	0.84	4.05	Two Wells ...	0.18	2.12	1.68	3.53
Bruce	0.60	1.67	1.23	2.97	Virginia	0.65	2.22	1.93	4.18
Wilmington .	0.45	1.97	4.04	5.54	Salisbury ...	1.00	2.35	3.57	4.80
Melrose	0.69	3.09	4.59	9.42	Teatree Gully	1.07	3.38	2.71	4.56
Booleroo Cntr	0.82	1.95	1.59	4.92	Magill	0.56	2.97	2.90	3.60
Wurrabara ...	0.61	2.13	2.21	6.95	Mitcham ...	0.45	2.44	3.06	3.75
Appila	0.62	2.18	2.03	7.10	Crafers.	1.47	4.39	5.90	7.39
Laura	0.84	2.09	2.81	7.10	Clarendon ..	0.67	3.61	4.24	4.19
Caltowie	1.18	2.14	2.77	5.09	Morphett Vale	0.62	2.74	3.52	3.57
Jamestown ...	1.20	2.16	3.07	3.32	Noarlunga ...	0.45	2.32	3.84	2.65
Gladstone ...	0.55	1.88	3.12	4.45	Willunga ...	0.51	2.75	4.05	4.37
Georgetown ...	0.70	2.25	3.01	3.40	Aldinga	0.13	2.62	2.30	2.63
Narridy	0.52	2.15	2.61	3.23	Normanville .	0.34	2.13	3.09	3.83
Redhill	0.44	1.85	2.35	4.21	Yankalilla ...	0.15	2.43	2.88	6.19
Koolunga ...	0.82	1.98	2.50	4.09	Eudunda	0.80	1.95	3.30	8.13
Carrietti ...	0.51	1.72	0.78	6.99	Sutherlands .	0.39	—	1.66	4.73
Eurelia	0.58	1.79	1.67	5.41	Truro.	0.75	2.14	3.45	4.30
Johnsburg ...	0.37	1.41	1.07	4.72	Palmer	0.73	—	3.23	5.16
Orroroo	0.51	2.33	0.93	4.91	Mt. Pleasant.	1.01	2.72	3.55	4.42
Black Rock ..	0.57	2.00	1.19	5.73	Blumberg ...	1.17	3.09	3.65	4.82
Petersburg ...	1.02	2.06	1.97	4.07	Gumeracha ...	1.87	3.21	4.25	5.16
Yongala	0.84	1.86	1.95	4.48	Lobethal	0.69	3.18	3.05	5.10
Terowie	0.96	2.00	2.77	7.89	Woodside ...	0.72	3.02	3.40	6.28
Yarowie	0.94	1.98	2.62	6.80	Hahndorf	0.88	3.33	4.78	6.96
Hallett	0.81	1.95	2.77	4.37	Nairne.	0.98	3.20	5.65	8.12
Mount Bryan	0.59	1.79	2.66	5.27	Mt. Barker ...	0.61	3.30	4.19	7.77
Burra.	0.88	2.35	3.49	6.40	Echunga	1.04	3.30	4.38	8.64
Snowtown ...	0.90	1.82	2.35	4.05	Macclesfield .	0.94	2.96	1.33	8.96
Brinkworth ...	1.32	1.96	2.89	4.63	Meadows ...	1.20	3.67	5.44	8.40
Blyth.	0.90	1.98	2.63	3.59	Strathalbyn .	0.71	2.40	3.49	7.00
Clare	0.96	2.75	3.45	6.38	Callington ..	0.47	2.18	2.69	5.48
Mintaro Cntrl.	0.74	2.12	3.90	6.36	Langhorne's B	0.66	1.94	2.17	4.48
Watervale ...	1.16	2.65	4.95	6.81	Milang.	0.38	2.16	1.69	3.14
Auburn	1.22	2.96	4.02	7.01	Walleroo ...	0.47	1.83	2.30	1.97
Manoora	0.56	1.92	2.44	6.09	Kadina	0.53	1.88	2.48	1.91
Hoyleton ...	1.19	2.20	4.12	3.67	Moonta	0.55	1.87	2.89	1.70
Balaklava ...	0.60	2.01	3.77	3.93	Green's Pins .	0.31	1.57	2.31	2.34
Pt. Wakefield	0.34	2.12	5.90	3.07	Maitland	0.68	2.00	4.13	2.41
Saddleworth .	0.71	2.53	2.31	6.17	Arddrossan ...	0.47	1.62	2.39	2.04
Marrabel ...	0.63	2.10	1.90	5.94	Pt. Victoria ..	0.63	1.56	3.05	1.73
Riverton	0.95	2.41	3.28	7.18	Curramulka .	0.15	2.01	2.71	2.78
Tarlee	0.86	2.16	2.39	5.88	Minlaton ...	0.13	1.74	2.27	2.82
Stockport ...	0.48	2.11	2.24	4.67	Stansbury ..	0.27	1.81	2.29	3.26

RAINFALL TABLE—continued

Station.	For March, 1911.	Average to end March.	To end March, 1911.	To end March, 1910.	Station.	For March, 1911.	Average to end March.	To end March, 1911.	To end March, 1910.
Warooka....	0.37	1.58	4.28	1.92	Bordertown .	0.58	2.17	3.19	3.95
Yoketown .	0.34	1.63	3.25	3.25	Wolsley....	0.50	1.82	3.10	4.42
Edinburgh..	0.17	1.85	2.23	3.67	Frances....	0.79	2.18	3.84	4.27
Fowler's Bay.	0.14	1.40	1.18	0.28	Naracoorte .	0.88	2.53	3.78	4.97
Streaky Bay.	0.53	1.63	1.95	0.12	Lucindale ...	0.90	2.36	4.00	5.30
Pt. Elliston..	0.39	1.41	2.03	0.34	Penola.....	0.65	3.20	5.04	5.92
Pt. Lincoln..	0.61	2.07	2.21	0.80	Millicent	1.81	3.31	6.49	3.78
Cowell	0.21	1.66	1.31	3.56	Mt. Gambier.	1.82	4.02	6.52	4.70
Queenscliffe .	—	1.72	—	4.46	Wellington ...	0.62	2.21	3.58	5.22
Pt. Elliot....	0.47	1.48	2.24	3.71	Murray Bridge	0.76	2.07	2.93	6.73
Goolwa	0.94	2.31	3.67	3.46	Mannum	0.30	1.79	1.74	5.72
Meningie....	0.63	2.21	2.62	3.24	Morgan	0.56	1.47	2.85	3.37
Kingston....	0.81	2.45	4.16	3.77	Overland Crnr	0.91	1.96	4.25	6.06
Robe	0.67	2.53	4.85	3.62	Renmark	1.10	1.73	4.69	4.68
Beachport....	1.02	3.06	5.46	2.40	Lameroo	1.16	—	1.99	4.15
Coonalpyn ..	1.35	2.05	3.38	4.17					

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on April 1st:—

BUTTER.—The supply of cream is much above the average for the period of the year, and both quality and demand are well maintained. The present prices are—Superfine, 1s. 0½d.; pure creamery, 11½d.

Messrs. A. W. Sandford & Co. report on April 3rd:—

POTATOES.—New locals, £4 to £5, Adelaide; Gambiers, £4 15s. to £5, on trucks, Adelaide or Port, per ton of 2,240lbs.

ONIONS.—New locals, £2 10s. to £3, Adelaide; Gambiers, £2 15s. to £3, on trucks, Adelaide or Port, per ton of 2,240lbs.

BUTTER.—Best factory and creamery, fresh in prints, 11d. to 1s 0½d.; lower grade factories, 8d. to 9d.; choice separators, dairies, 10d. to 11d.; medium quality, 8d. to 9d.; well-flavored stores and collectors, 7d. to 8d.; off-conditioned lots, 6d. to 6½d. per lb.

CHEESE.—Factory makes, 4½d. to 5d. per lb.

BACON.—Factory-cured sides, 6½d. to 7d.; middles, 7d. to 7½d. per lb.

HAMS.—In calico, 8d. to 8½d. per lb.

EGGS.—Prime, guaranteed new-laid hen, 1s. 4d.; *c.c.* refrigerator, 1s. per dozen.

LARD.—Skins, 6d.; bulk, 5½d. per lb.

HONEY.—Prime clear extracted, new season's, 2½d.; secondary quality, 1d.; beeswax, 1s. 2d. per lb.

ALMONDS.—Soft shells, Brandis, 6½d.; mixed soft shells, 6d.; kernels, 1s. 1d. per lb.

LIVE POULTRY.—Good table roosters, 2s. 9d. to 3s. 3d. each; plump cockerels, 1s. 9d. to 2s. 6d.; hens and light cockerels, 1s. 6d. to 2s.; ducks, 2s. to 3s.; geese, 3s. 6d. to 4s. 6d.; pigeons, 8d.; turkeys, 7d. to 11½d. per lb, live weight, for fair to good table birds.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		April.	May.			April.	May.
Amyton	*	—	—	Meningie	914	15	13
Angaston	895	8	13	Merghiny	*	6	4
Appila-Yarrowie	*	—	—	Millicent	*	11	9
Arden Vale & Wyacca	*	—	—	Miltalie	903-4	8	13
Arthurton	*	—	—	Minlaton	*	15	20
Balaklava	895	18	—	Mitchell	904	15	13
Beetaloo Valley	893	—	—	Monteith	*	—	—
Belalie North	*	8	6	Moonta	*	—	—
Blyth	896	18	16	Morchard	*	—	—
Bowhill	*	—	—	Morgan	909	8	13
Bowmans	*	13	11	Morphett Vale	†	—	—
Brinkworth	*	—	—	Mount Bryan	*	8	6
Bute	*	—	—	Mount Bryan East ..	*	1	6
Butler	*	—	—	Mount Gambier	917	—	—
Caltowie	*	8	6	Mount Pleasant	914	14	12
Carrieton	891	13	11	Mount Remarkable ..	*	13	11
Cherry Gardens	910-11	11	9	Mundoora	*	—	—
Clare	897	14	12	Murray Bridge	*	—	—
Clarendon	*	10	8	Nantawarra	899	12	10
Colton	†	8	13	Naracoorte	*	8	13
Coomooroo	891	10	15	Narridy	†	15	—
Coonalpyn	*	—	—	Northfield	900	11	9
Craddock	*	—	—	Orroroo	*	—	—
Crystal Brook	†	—	—	Parrakie	909	1	6
Cummins	*	8	13	Paskeville	901	8	11
Davenport	892	—	—	Penola	*	1	6
Dawson	*	—	—	Penong	905	8	13
Dingsbledinga	*	14	12	Petina	*	—	—
Dowlingville	*	—	—	Pine Forest	902	11	9
Elbow Hill	902	—	—	Port Broughton	*	14	12
Forest Range	912	13	11	Port Elliot	915	15	20
Forster	908	6	4	Port Germein	894	15	—
Frances	916	7	12	Port Pirie	*	1	6
Freeling	898	—	—	Quorn	892	15	—
Gawler River	898	—	—	Redhill	*	11	16
Georgetown	*	15	13	Renmark	*	—	—
Geranium	*	29	27	Saddleworth	*	15	19
Green Patch	902	3	8	Salisbury	900	4	2
Gumeracha	*	10	8	Shannon	906	—	—
Hartley	912	8	13	Sherlock	*	—	—
Hawker	*	17	8	Stockport	*	—	—
Hookina	892	25	—	Strathalbyn	*	17	15
Johnsburg	*	—	—	Sutherland	*	—	—
Kadina	*	13	11	Tatiara	918	—	—
Kalangadoo	916	8	13	Uraidla and Summert'n	915	3	1
Kanmantoo	†	8	12	Utera Plains	907	8	13
Keith	*	—	—	Waikerie	910	—	—
Kingscote	912	4	9	Watervale	901	—	—
Kingston	†	29	27	Wepowie	*	—	—
Koppio	903	—	—	Whyte-Yarrowie	895	—	—
Kybybolite	917	13	11	Willowie	†	—	5
Lameroo	*	—	—	Willunga	*	1	6
Lipson	*	—	—	Wilkawatt	910	—	—
Longwood	913	12	10	Wilmington	†	12	10
Lucindale	917	—	20	Wirrabara	893	1	—
Lyndoch	†	13	11	Woodside	*	—	—
Maitland	*	1	6	Yadnarie	907	8	13
Mallala	899	3	1	Yallunda	*	—	—
Mannum	*	29	27	Yongala Vale	†	8	13
Meadows	914	—	—	Yorketown	902	8	13

* No report received during the month of March.

† Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Carrieton, February 16.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Gleeson (chair), Vater, Beerworth, Fisher, Earl, Ormiston, Byerlee, King, Radford, and Bock (Hon. Sec.)

WEIGHING WHEAT.—Considerable discussion took place concerning the existing arrangements for weighing wheat at railway stations. The Chairman said that the scales employed became worn and knocked about by rough usage and by being continually moved from load to load of wheat. He considered the Government should erect weighbridges, so that wheat could be weighed in bulk. Farmers would gladly pay a moderate charge for the use of these.

GOOD YIELDS OF WHEAT.—Mr. Vater reported having harvested from 46 acres of Jonathan wheat, drilled in with super., 31bush. per acre. Thirty acres of Federation similarly treated returned 26bush. per acre. Both plots were on well-worked fallow. The district as a whole gave very fair returns.

CULTIVATORS.—Discussion took place as to the best cultivators to use in some of the local hard and stiff soils. A number of farmers in the district had taken up the old V-shaped scarifier in preference to the newer cultivators, as it did better work.

Carrieton, March 16.

(Average annual rainfall, 11½ in.)

PRESENT—Messrs. Gleeson (chair), Manning, Byerlee, Ormiston, Earl, J. F. and C. G. Fisher, Vates, Beerworth, Williams, Radford, Bock (Hon. Sec.), and one visitor.

FAREWELL TO A BRANCH FOUNDER.—The business of this meeting was to bid farewell to the Chairman, Mr. W. J. Gleeson, who was moving from the district. Mr. Gleeson was one of the foundation members of this Branch of the Agricultural Bureau, and during the Branch's whole existence he had displayed the greatest interest and worked very hard for its welfare. It was stated that Mr. Gleeson was one of the best farmers and dairymen in the district. He was the first in this locality to purchase a separator and to take up experimental work in regard to cereals in special plots set apart for the purpose. Mr. Gleeson had always been ready to give members of the Bureau full advantage of any knowledge gained in his experiments and ordinary farm work. There was now only one other member of the Branch who had been in it since its inception.

Coomooroo, February 20.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Berriman (chair), Hall, Avery, Robertson, E. and E. C. Brice (Actg. Sec.).

STUBBLE-BURNING.—Discussion took place as to the wisdom or otherwise of burning stubble in this district. Mr. Robertson said stubble should be burned early on a hot day, when there was a gentle breeze. If there was a strong wind blowing the fire travelled too quickly to do its work thoroughly. Burning the stubble left the land comparatively free from seeds of weeds, and a better crop could be grown. Mr. Berriman thought it inadvisable to burn the stubble unless it was desired to plough the land. The fire did not clean the land, and the feed was always of value. The feed grew better in the stubble because of the shelter afforded by the latter. Mr. Avery thought it advisable to run a fire over the grass before summer. If the shell of the seed was cracked by the fire, the weeds sprang up after the first rain. Mr. Hall thought the fire killed half the seeds

of weeds. The others sprang up after the first rain, and if fed down with sheep much less work was needed in spring to keep the fallow clean. In this district it was generally considered that the fire loosened the ground. The sun also did this, as it was easier to plough in the autumn before the rain than it was in the late spring. The rain set the soil down so firmly.

Davenport, March 16.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Bothwell (chair), Messenger, Hewitson, and Lecky (Hon. Sec.).

(CONFERENCE ON DRY FARMING.—Mr. Hewitson read some notes on the inter-State conference, held in Adelaide, concerning farming in dry areas. He said that the conditions of soil and climate in Australia were quite distinct from those of the United States of America. Areas under a rainfall of 12in. to 15in. were cultivated with the certainty of a good harvest in this country, while in the United States of America such land could only be made productive under so-called dry farming methods. In studying the principles underlying the methods associated with the name of Campbell, modifications of those methods would have to be made to meet local conditions in various parts of Australia where the rainfall was light. He considered that some experimental plots, similar to those conducted by the department at Hammond, should be established in this district, and that cotton, barley, rape, and linseed should be grown as well as wheat. These would be of value as rotation or fodder crops. The decision to make the inter-State Conference an annual event was wise, and the convening of this first Congress was more than justified. After some discussion it was decided to ask the department to conduct some experimental work in this locality.

Hookina, February 13.

PRESENT.—Messrs. Sheridan (chair), Kelly, Henschke, O'Connor, Gloede, P. and B. Murphy, Carn, F. and S. Stone, Madigan (Hon. Sec.), and two visitors.

FARMING ON SMALL CAPITAL.—A paper from the report of last Bureau Congress, on "Farming with Small Means," was read and discussed. Mr. Henschke thought it was not possible for a man to commence with such a small sum as £100. A good team of horses could not be purchased at that price. Mr. O'Connor said a man need not be afraid to commence with a capital of £100. He could purchase a team of bullocks and use them for wheat-carting. He could also do wheat-lumping and other work to keep the "pot boiling" till he made something from his own land. Government land could be procured on far more reasonable terms to-day than it could 30 or 35 years ago. The Government loans under the "Advances to Settlers Act" also made it much easier to bring land under cultivation, and with up-to-date implements a man could cultivate a larger area than three men could in earlier days.

Quorn, March 11.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. Thompson (chair), Noll, Brewster, Schulze, and Patten (Hon. Sec.).

THOROUGH CULTIVATION.—The following paper was read by the Chairman:—"Good cultivation is equal to a dressing of a good fertiliser. This is strikingly confirmed by the result of some experiments reported by the Department of Agriculture at the Cape. A piece of land was divided into plots and uniformly dressed with a complete fertiliser. After being ploughed, as stated below, a cultivator was run over the land and oats sown with the drill; the land was then rolled. Each successive plot, however, had received one more ploughing than the previous one and the yields rose correspondingly in steadily ascending order. Plot 1, once ploughed, yielded 750lbs. oaten hay per acre; plot 2, twice ploughed, yielded 1,000lbs.; plot 3, thrice ploughed, yielded 1,880lbs.; plot 4, four times ploughed, yielded 3,800lbs. per acre. Equally striking results were obtained from the barley and wheat crops planted during the past year. One plot of each was ploughed and harrowed once only, but each succeeding plot was cultivated once more than the previous one. The results of these experiments emphasize the importance of careful tillage, and show that, although manuring is highly important, yields can be still further increased by extra ploughing or cultivating. In India, where the peasants often find it difficult to obtain fertilisers and labor is cheap, they obtain good crops by increased cultivation, and frequently plough their land four or five times." Mr. Noll quite agreed

with the paper. Even with manure the land needed to be well cultivated to give good results. Mr. Brewster considered the secret was thorough tillage. Few farmers practised it as they should.

Wirrabara, March 11.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. H. E. Woodlands (chair), E. J. and W. H. Stevens, E. and G. Hollett, Hoskins, Pitman, Marner, A. Woodlands, Cumow, P. and H. Lawson (Hon. Sec.), and one visitor.

MIXED FARMING.—A paper on this subject was read by Mr. E. J. Stevens. In districts such as this, he said, where land brought high prices, a farmer should have his money in several pockets. Wheat and wool were the main products, but in places fruit and dairy stuff could be produced. Fallowing and grazing with sheep were two most important factors in wheat-growing, and it was best to divide the farm and crop the land only once in three years. Fallowing should be commenced as soon as seeding was over. The plough should have good mouldboards and turn the land well. He would cultivate to about half the depth of the ploughing, and would harrow well after drilling in the seed. This helped the crop to withstand any dry spell that might occur in the spring. The paddocks should be fairly small so that the sheep could have a change of pasture at frequent intervals. It was a good plan to secure the right to graze some other land when short of feed, so as to be able to keep sufficient sheep to eat off everything on the farmer's own land. One or two cows should be kept on every farm, but from a dairying point of view cows did not pay so well away from the riverside, and it was more profitable there to keep sheep. One or two pigs and some poultry should also be kept to provide the homestead. The paper then dealt with the value of a blacksmith's forge on the farm, and advocated care and prompt repairs to harness, implements, &c. Finally he urged members to make a garden round their homes. Members generally agreed that farmers should have a number of side lines in addition to the main crop. It was mentioned that geese were very profitable poultry to raise.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, March 14.

PRESENT.—Messrs. Burton (chair), Petrie, Bartium, Curtin, Woolford, Ryan, Jacobie, and F. Bartrum (Hon. Sec.).

FARM MANAGEMENT.—The Hon. Secretary read a paper on "Farm Management" in general terms, and at the outset said that no hard and fast rules could be laid down for exact details. The farm should be substantially fenced, especially at the boundary. Good gates should be put in where necessary, and barbed wire makeshifts always avoided. Out-of-date machinery, which failed to do the best work in a given time, should be discarded for better plant. It paid the farmer to keep abreast of the times. He believed in the complete harvester because with it one man could do the same work that required three with the stripper and winnow. He thought shelter-sheds for implements, &c., should be built of stone and iron in preference to straw, and no man should be so neglectful as to leave expensive machinery exposed to the damaging influences of the weather. Little breakages should be repaired at once, as delay in effecting necessary repairs usually resulted in more serious trouble and involved considerably greater cost to put things right. Cleanliness and regularity should be strictly observed in dealing with all animals on the farm, and it would then be found that they would do better work in every respect than if treated in a more haphazard way. In discussing the question the members agreed generally with the views expressed. They especially emphasized the wisdom of erecting good gates from the start.

FRUIT CROP.—It was stated that the fruit crop, as a whole, had been very satisfactory in this district,

Port Germein, February 18.

(Average annual rainfall, 12in.)

PRESENT.—Messesrs. Carmichael (chair), Head, Blessing, Simper, Holman, Deer, Hillam, Stock (Hon. Sec.), and one visitor.

ANALYSES OF LOCAL SOILS.—Mr. Carmichael reported that some time previously steps had been taken to have analyses made of various typical soils to endeavor to find out why the crops on the sandy hills did not respond to the use of fertilisers in the same way as those on the heavier soil. The department undertook to analyse the soils submitted by Mr. Carmichael, and the following results were reported by the Government Analyst:—

No.	Description.	Fine Earth.	Nitrogen.	Phosphoric Acid.	Lime.	Potash.
		%	%	%	%	%
1.	Sandy loam (light yielding).....	82.5	.021	.032	.098	.136
2.	Loam (good yielding).....	95.5	.031	.040	.224	.262
3.	Red sand (light yielding).....	98.	.012	.027	.098	.089
4.	Red sand (light yielding).....	99.5	.017	.022	.112	.149
5.	Loam (good yielding).....	96.5	.038	.042	.238	.272

The analysis showed that No. 2 was better in all respects than No. 1, and that No. 5 was a much better soil than Nos. 3 and 4, which were in the same section. They were all low in nitrogen and lime, fairly good in potash, and somewhat deficient in phosphoric acid. From a chemical point of view Nos. 1, 3, and 4 would be greatly improved by lime, and the addition of farm manure or green crops ploughed in to help raise the percentage of organic nitrogen. The deficiency in the lime contained in the sandy soils possibly explained the poor result from applications of superphosphate.

Port Germein, February 28.

(Average annual rainfall, 12in.)

PRESENT.—Messesrs. Carmichael (chair), Crittenden, Head, Hillam, Holman, Hacket, Coe, Blessing, Deer, Turner, and Stock (Hon. Sec.).

NOTES ON THE HARVEST.—The following review of the season was read by Mr. Blessing:—"The year 1910 has been almost a record one as regards rainfall, for seldom before has over 20in. been registered at Port Germein. At my own place in the hills we had nearly 37½in. Yet, with this record rainfall, the harvest has turned out very disappointingly in most cases, although some phenomenal crops of 30bush. to 40bush. have been reaped. The average for this and surrounding districts is very much below that of the previous year. What has been the cause of this comparatively poor return? Is it slovenly or lazy farming? It may have been in some cases, but the poorest returns have been from crops sown before the May rains and where the land has been worked in a dry state in the summer. In my own case the paddock that was sown before the May rains, and had the best cultivation, yielded only half as much as that which was sown after the rain. On the lighter or sandy soils the excessive rains during the winter and spring were responsible for the low yields, showing that we can have too much of a good thing. But if the returns from the wheat have not been as good as they might have been, those who keep sheep have experienced a good year, as feed has been plentiful. There has been a record lambing and a good price for the wool and surplus stock. In regard to fruit and vegetables, the year 1910 was anything but good. In my own case stone fruits—especially peaches and apricots—were almost a total failure: this was chiefly owing to the cold spell in October, with hail and snow. The apple crop promises to be very good in the Wirrabara district, provided seasonable weather prevails during the next two months. One lesson we may learn from the past year is not to carry all our eggs in one basket." A good discussion followed, and the experience of those present was generally that during the past season the best crops were on land that had not been much worked, and on which melons and other weeds were allowed to grow until seeding time.

MANURES v. NO MANURES.—Mr. Crittenden gave an account of some experiments he had carried out with and without fertilisers. The conclusion he arrived at from these experiments was that the land well worked, sown thickly, without fertilisers, gave the best results. In the discussion which followed the general view was that the exceptional season had more to do with results obtained than the working of the soil.

Whyte-Yarcowie, March 25.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lock (chair), Travers, Walsh, Hunt, Ward, Cann, Melrod, Mudge, A. and F. Mitchell, Faulkner, and Jenkins (Hon. Sec.).

CO-OPERATIVE WHEAT-STORING SHEDS.—The Chairman initiated a discussion on co-operative storage of wheat. One member considered those farmers who did not like the present system of storing with merchants would do well to form a syndicate and build a large store on a railway enclosure, space to be apportioned according to number of shares taken up by members. A general discussion took place on the proposal; but while members were agreed that the present system of storing with merchants was not all that could be desired, they were divided in opinion as to the wisdom of erecting a store.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, March 11.

(Average annual rainfall, 21½ in.)

PRESENT.—Messrs. Wishart (chair), Player, Smith, Swann, Salter, Stephens, Heggie Friend, Plush, Giles, Sibley, and three visitors.

QUESTION DAY.—In reply to a number of questions, the following information was elicited:—

Current-drying.—Mr. Stephens found it advisable to finish off drying currants on the ordinary wooden tray. The wire netting trays gave splendid results and were a valuable adjunct to getting a crop off quickly.

Oidium.—Mr. Smith explained that for oidium vines should be sprayed with Bordeaux whilst in a dormant state.

Fertilisers.—Members had, in the majority of cases, found that with the application of commercial fertilisers the trees and vines made a great deal of wood, but did not increase the fruit yield to any extent.

Pears on Quince Stocks.—It was the general opinion that it was unadvisable to graft the Duchess pear on quince stocks, but the Glou Morceau did well on the quince. The Duchess might do well for two or three years, but then died.

Growing Fodder Crops between Fruit Trees was a question of irrigation and manure. If the experiment were tried in a wet section it might be found to be a success. Generally in this district it was not advisable.

Deep Ploughing.—The value of this depended on the quality of the soil, but it was believed that the deeper the ploughing in the vineyard or orchard the greater the benefit.

Pruning Apricots.—Members wished to know something of the new system of pruning apricot trees adopted at Renmark. [The Horticultural Expert (Mr. Geo. Quinn) replies:—“The only variation from the ordinary methods of pruning the apricot discovered by me at Renmark and Mildura was an inclination to permit the leaders to remain uncut at the winter pruning. This results in the formation of fruit spurs and shoots along nearly the full length of the leader, and a heavy crop is usually obtained. These spurs, however, are largely of a weakly nature, and may fruit a second time, but many perish without doing so. Under conditions of exceptional vigor this method results in obtaining crops, but in most instances it is found that either the whole leader must be cut back to force out a fresh one a year or so later, or, if shortened only, its worn-out dead fruit shoots must be pruned off individually—a task involving much work. The system needs to be thoroughly tested over a series of years before it can be recommended for general adoption.”—Ed.]

Balaklava, March 18.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Goldney (chair), Tuck, Roberts, Thomas, Spillane, Uppill, Banyer (Hon. Sec.), and one visitor.

PIG-RAISING.—Mr. Thomas read a paper on “Pig-raising” to the following effect:—A sow that does not raise more than seven or eight pigs cannot profitably be kept. A good one should raise at least 20 pigs each year, and should continue doing this 10 years.

Old sows produce large litters, and, as a rule, make better mothers than younger ones. A sow should not be mated until she is seven or eight months old. At all times she should have plenty of exercise and be well fed. Before farrowing she should be placed in a comfortable pen, with sufficient fine bedding. After farrowing give a warm drink, but nothing else for 24 hours. For the first few days feed lightly. As the young pigs grow older give the sow all the food she can eat. If a portion of the pen be set apart so that the young pigs can have access to a trough of grain and milk the young family will become self-dependent. Castration should be done before the pigs are weaned, and this should be when about seven weeks old. After the first separation the sow should be returned to the pigs once or twice at intervals of 12 hours. About the fifth day after weaning takes place the sow may again be mated. The young pigs after weaning should be kept growing, and to secure this they should be fed liberally. Ashes should be kept within their reach at all times. Things to be remembered are—Do not keep more pigs than you can maintain in good growing condition. Exercise and cleanliness are essential to profitable pig-raising. Get litters on the market as early as possible. Do not keep two or three sows doing only the work of one. Kind treatment, even of pigs, pays. Mr. Tuck said that in late years the minor things on the farm had been overlooked. They had been wheatgrowers rather than farmers. Pig-raising, poultry-keeping, and kindred things should be followed up; but these minor industries took up a lot of time, and there was the labor difficulty. There is no telling when the farmer might be left with all these things on his hands, and the work could not be got through. He would like to have had something in the way of proof that pig-raising paid. He recently bought five weaners at 3s. each, and he was sure it did not pay the grower. If they could not get 6s. or 7s. each for weaners, in his opinion, they did not pay. Mr. Harford considered farmers would be wise to go in for other lines as well as wheat-growing. It would pay to buy store pigs in a low market and fatten them quickly. Mr. Tuck had had experience of fluctuating markets. One cool market day he sold some pigs at 10s. On a hot day a month later he could only get 2s. 6d. In reply to the Chairman Mr. Thomas said one method of guarding against a sow eating her young was to give rusty bacon a week or two before farrowing. Mr. Thomas kept Berkshire and Essex breeds. He sold his weaners at seven or eight weeks old, and got what he could for them. It did not pay to keep them for eight or nine months. He had found "cyclone" fencing the best for pig-yards.

Blyth, March 21.

PRESENT.—Messrs. McEwin, Schuster, Schultze, Pedler, Dunstone, Buzacott, Longmire, Zireck, Shopherd, Eime (Hon. Sec.), and one visitor.

FARMING.—Mr. McEwin read a paper and referred to the inter-State conference recently held in Adelaide on dry farming. He thought the discussions tended to confirm the opinion that farmers in this country were working along the right lines. He considered, however, that the deep ploughing advocated for dry farming was an idea that had been exploded for some years. [This depends entirely upon soil and local conditions.—ED.] He believed a better seed bed could be made by working fallow with the cultivator instead of the plough, and as it cost no more to cultivate twice than to plough once, he intended to test the matter on at least 100 acres, and considered that other farmers would be well advised to conduct similar experiments. He believed in summer working of fallow, and had had his cultivator going since harvest. The difficulty of obtaining labor, however, prevented him from working as much land as he would like. The man who was methodical and planned out his farm work usually came out all right at the end of the season, and only by such management could large areas be profitably farmed. With the present low prices offering for wheat farmers should consider whether more money could not be made in keeping sheep. Most of those present agreed that in many districts deep ploughing would be unsatisfactory. Respecting the best time for seeding in this district, Mr. McEwin favored commencing early in April and completing by the end of May, but the majority thought it best to commence at the beginning of May and get the work through early in June.

HAY MAKING AND STACKING.—A paper on this subject was read by Mr. Eime. He considered the best time to cut hay was as soon as the grain had thoroughly filled the sheath. Oaten hay should not be cut until the crop had started to change color. He liked to have an early variety for hay, to enable him to get the hay out of the way before

the grain harvest commenced. King's Early was a good variety for hay in this district, and horses were very fond of it. After cutting the hay should be left for at least a day before stooking, but not long enough to damage the color. It was unwise to lay the sheaves on the ground instead of stooking them, as the bottom ones were frequently damaged and the hay could not dry so well. Carting should commence about two weeks after cutting, according to the condition of the hay. It paid to put down a good layer of straw, or, better still, some timber to build the stack on. The latter should be from 4yds. to 7yds. wide, according to the length of the hay. If the first row of sheaves was placed perfectly true it was comparatively easy to keep the stack straight throughout. The centre should be kept 18in. or 2ft. higher than the outside to keep the wet out. It was preferable to bind over with the butts, as then poultry and mice could not do so much damage as they could where the stack was bound over with heads. The walls should be built quite straight, as the weight of the stack would set it out sufficiently. Some sort of elevator was needed for stack-building to lift the hay right to the top from the ground.

Clare, February 10.

(Average annual rainfall, 24in.)

PRESENT.—MRS. McKENZIE (chair), Radford, Bowman, Forbes, Lockyer, Seales, Pink, Pryor, Dux, Kolloshch, Kelly, Hill, Jarman, Keane, J. H. and P. H. Knapstern (Hon. Sec.).

DAIRYING.—A paper on "Dairying" was read by Mr. Forbes. A good dairy herd properly managed, he said, was a paying proposition. There was fine dairying land near Clare and a plentiful supply of good water for stock and irrigation. The difficulty of getting produce to market was the greatest drawback. He then described what he considered to be the external indications of a good cow, and proceeded to say that the site for a dairy farm should be chosen where lucerne could be grown in abundance, and where good water was plentiful. Each milkman should milk the same cows each day, and a man who lost his temper in dealing with the cows should not be tolerated for a moment. Milking should be done at regular hours, and the cows were better if fed while being milked. He gave chaff and bran mixed, and also green lucerne or lucerne hay. When drying off a cow she should not be turned out while any butter fat remained in the milk. She should have from six weeks to two months' rest before calving. He liked Shorthorn crossbred cow for dairy purposes. They were hardy, and when milking days were done would bring in a good sum. Then calves were also bigger at birth and therefore brought more money if sold for veal. The paper then continued—"The rearing of heifer calves from the best milkers should have very careful attention for the first six weeks. If put too soon on skim milk their constitutions are practically ruined; they cannot possibly grow into strong healthy cows. Most dairymen take the calves from the cow at birth and put them on the bucket. This is very injurious to the calf. It should be allowed to suck its mother for at least three days. After that time give them sweet milk for five or six weeks; then put on gradually to skim milk with a little linseed tea and ground wheat, for since the introduction of the separator there is little nourishment left in the milk. Calves put on the bucket too soon develop a poddy appearance, as they begin eating all sorts of rubbish. If more attention were paid to the welfare of the calf there would not be so much fear of 'dry bible.' Rear the calves in a natural way and success is sure to follow." Messrs. Seales and Pink agreed that calves should be allowed to run with the mother for the first week after birth and then be fed with fresh milk out of bucket for six weeks at least. In reply to a question Mr. Forbes said that it was better not to use maize and sorghum, as it was rank poison at certain stages of its growth, and therefore injurious to cattle. He preferred to use wilted lucerne, cut when just coming into bloom. It was advisable to wet the chaff when feeding to cows. During the discussion the opinion was expressed that ensilage was one of the worst foods for cattle. It brought about dry bible, irritated the lining of the stomach, and had other bad effects. For the first year the milk flow would be increased, but after that it would gradually diminish, and at the end of three or four years the cow would be useless as a milker. [We are not aware of the authority for these extraordinary statements concerning ensilage. They are, however, quite opposed to the experience of dairymen throughout the world, ensilage being considered by the best authorities and those with most experience as almost a necessity in dairying. While sorghum in certain early stages of growth is injurious to cattle, we have had no similar complaints in respect to maize; in fact, many growers now put in maize in preference to sorghum for the reason that there is no risk if the stock should get into a young maize crop.—Ed.]

Freeling, February 10.

(Average annual rainfall, 17½in.)

PRESENT. MESSRS. Neldner (chair), Leske, Mattiske, Harvey, Block (Hon. Sec.), and two visitors.

CLEANING WHEAT ABOVE STANDARD.--Mr. Mattiske said he always made a practice of cleaning his wheat thoroughly, but although he turned out a very fine sample he received no encouragement from the buyers. Mr. Leske considered that all farmers should thoroughly clean the wheat and make the best sample they could, as it devolved upon all producers to turn out the best products possible. The Hon. Secretary considered that while the farmer who cleaned his wheat until it was over the standard did not receive any direct monetary benefit from the buyer he made a good name for himself as a reliable man from whom to purchase seed wheat, and also helped to raise the standard of South Australian wheat. Another feature was that he set a very excellent example to his neighbors.

FARM PESTS.--Among other suggestions for the destruction of sparrows and starlings the one most favored was to feed these birds on good wheat until they were thoroughly accustomed to the feeding ground, and then to give them poisoned wheat. Rats could be destroyed by using poisoned wine.

Gawler River, February 11.

(Average annual rainfall, 18in.)

PRESENT.--MESSRS. A. J. Bray (chair), Roediger, Richter, B. and J. Hillier, Dunn, Dawkins, Hayman, Winckel, F. Bray (Hon. Sec.), and one visitor.

UNPROFITABLE PRACTICES.--Mr. Richter read a paper, in which he outlined a few practices which, in his opinion, did not pay the farmer. The first was growing his own vegetables. He thought that the farmer's time was more profitably spent in the field than in growing vegetables. If the farmers all grew their vegetables the gardeners would suffer. He thought each should keep to his own vocation. [There are scores of farmers who could never have fresh vegetables on the table unless they grew them themselves. — *En.*] He also thought it did not pay to grow wheat for show purposes. The extra time and care involved often only brought disappointment. One variety of wheat might not be as good as another and yet might weigh ½lb. more per bushel. It was a mistake for a farmer to pay very high prices for land in the endeavor to extend his holding; the average farmer would be better advised to work a small area more thoroughly. In the discussion which followed Mr. Roediger considered it advisable for most farmers to grow vegetables for home consumption. The work could be done at odd times and need not lessen the attention paid to wheat-growing and other main interests. Mr. Winckel thought it did not pay farmers to grow their own vegetables. Mr. Hayman said he intended to experiment with vegetable-growing this year. In his opinion the present system of judging wheat at shows was not satisfactory. He thought points should be awarded for milling qualities, yield per acre, and not merely by the weight of the grain. Mr. Roediger agreed with Mr. Richter in regard to the lack of inducement to show wheat. Regarding the value of land he thought the best way to form a correct estimate was to take the average returns for a number of years, the average price for the period, a fair estimate of the labor, and add 5 per cent. for interest on money paid for purchase. In this way one could work out a reasonable figure to be paid for the land. He thought it risky to pay too high a figure for ordinary farm land.

Gawler River, March 10.

(Average annual rainfall, 18in.)

PRESENT.--MESSRS. A. J. Bray (chair), Dawkins, Leak, Rice, J. and B. Hillier, Richter, Hayman, Davis, Winckel, F. Bray (Hon. Sec.), and two visitors.

REARING CALVES.--A short address on rearing calves was delivered by Mr. Leak. To be successful in dairying, he said, good stock must be secured. The rearing of calves for the future herd was of the utmost importance. Good feeding and housing were necessary. They should be taken from their mothers when two or three days old, and fed with new milk three times a day for the first two or three weeks. After this skimmed or separator milk could be given with meal and salt added instead of the new milk. Later on bran and dry feed would take the place of the milk altogether. Calves did better in a yard provided with a shelter-shed than they did if tied to a post or shut in a small

shed. In the discussion which followed Mr. Richter said he would take the calves from the mothers soon after birth. The cows then gave their milk better, and calves fed better than if they were allowed to remain together for two or three days. Unless tied to posts calves would need a yard each, or would learn to suck one another. Mr. Davis agreed with Mr. Leak in the principal points, and thought it best for the calf to have its mother's milk for the first three days to a week. Mr. Winckel agreed with the previous speaker. Messrs. Hillier and Dawkins thought it wise to keep a calf in a small pen or tied up at first, with plenty of clean straw under it. It was necessary to feed a calf for a time after it was turned out into a paddock. Mr. Hillier used a little molasses with separator milk for calves. Members agreed that all froth should be removed from separator milk before feeding it to calves.

Mallala, March 6.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. Marshman (chair), Nairn, Frayne, Temby, Jarrolyn, McCabe, Murphy, Nevin (Hon. Sec.), and one visitor.

VALUE OF THE AGRICULTURAL BUREAU.—Mr. McCabe read a short paper setting forth some of the advantages of Bureau membership, and enumerated some of the ways in which the Bureau system helped the man on the land. He mentioned some of the benefits he had personally received during the past 20 years. As this was the only organised body representing the farmers, it should be a matter of importance to all the producers. He then touched upon the good work done by the department generally, and mentioned that the value of this work had been greatly enhanced by the existence of such a medium as the Bureau, to convey results right to the farmers. As more country came under cultivation the importance of the institution would increase, the more so if farmers instead of selfishly taking no part in the work of the Bureau, but reaping the benefits of its existence and energy, would throw in their lot and help to increase its usefulness and influence. Members were unanimous in their testimony as to the immense value the Bureau had been and still was to the producers of the State generally. The Chairman urged on members the necessity of securing more members, especially from the ranks of the young farmers. These men had enjoyed good education, and were specially able to take an intelligent interest and to prove most effective members.

Nantawarra, March 18.

(Average annual rainfall, 15 in.)

PRESENT. Messrs. Sutton (chair), Smith, Sinclair, Nicholl, Greenshields, Dixon, J. Nicholls (Hon. Sec.), and four visitors.

TAKEALL.—Some discussion concerning this wheat disease took place. Mr. R. Nicholls said that in this district takeall was worse than red rust, and perhaps even than drought itself. With regard to the benefit to be obtained by growing oats, he mentioned the following facts. Some years ago after taking a crop of wheat off fallow ground the paddock was sown with a mixture of two-thirds oats and one-third wheat for hay. He was now convinced that the mixing of the one-third wheat was a mistake, as when the paddock was subsequently fallowed and sown with wheat the crop was badly affected by takeall, although takeall was not very prevalent that year. The land was then sown with oats alone, and, after being fallowed, in the usual course was sown with wheat and yielded a heavy crop free from takeall. This was during the past season, when takeall had been more prevalent than it had been for years. Mr. Herbert said that growing oats appeared to stamp out the disease. Possibly some variety of wheat that was practically immune to takeall might yet be found. He wished to know if members had noticed any Huguenot or Indian Runner wheat affected by takeall. He would also like to know if the feeding value of these wheats when cut for hay was equal to ordinary wheat. If they were equal to other wheats they would be very profitable. Indian Runner grew to a great height, and gave a heavy yield of both hay and grain. Mr. Smith said that with him Huguenot grew to a great height. It was free from takeall, and stock did well on the hay. Mr. Greenshields had noticed that Huguenot did better on the heavier soils. He had seen it affected by takeall. Mr. Dixon had noticed some reports to the effect that takeall had been discovered in oat crops. The Acting Secretary had also noticed the reports. He was not perfectly satisfied that white oats were always absolutely free from takeall, but he thought that in this district it had been conclusively proved that growing a crop of oats on land improved it for wheat-growing as far as takeall was concerned. [The question of reported discovery of the takeall fungus on oats is dealt with in the report of Whyte-Yarowic Conference, on page 884 of this issue.—Ed.]

Northfield, March 14.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Williams (chair), Dall, Kelly, W. and S. Eastwood, Wright, Roeger, McCauley, and Nelson (Acting Sec.).

LUCERNE-GROWING.—Mr. Williams read a paper on this subject written by Mr. S. McIntosh, and printed in the January issue of the *Journal*. Mr. Dall said that he had been experimenting with lucerne in this district for some time. On a two and a half acre block he had fed five cows five or six times during the summer, turning them on to the lucerne for about a week at a time. After it had been eaten down the fodder quickly sprang up again. Mr. McCauley said cattle would not eat well-irrigated lucerne as readily as that which was lightly watered. After further discussion members agreed to undertake practical experiments to ascertain the value of this plant as a fodder for this district.

HARVESTING LUCERNE SEED.—Members wished to know the best way to harvest lucerne seed. [The Director of Irrigation (Mr. S. McIntosh) replies—“Some growers gather their crop with the ordinary stripper, fitted with a close and well curved comb, afterwards putting the unthreshed pods through a thresher when they are dry and the weather is warm; then through the ordinary winnower with a perforated zinc sieve. In New South Wales, as far as I can ascertain, the generally adopted method is as follows—Cut the crop when the seed is fully matured (but not dry) the first thing in the morning, then let it dry for from one to three days; place in small heaps with the pitchfork (also in the morning or evening). Take into the stack as soon as it is sufficiently dry. Do not handle during very hot weather, as a lot of the seed is lost in such a case. Be careful not to cut or handle the crop when it is wet, or damp with dew. The crop is then threshed with the ordinary wheat-thresher fitted up with fine screens. Clean with the ordinary winnower as in the former method. Jas. Martin & Co., of Sydney, are agents for the best lucerne-thresher of which I know.”—Ed.]

Salisbury, March 7.

PRESENT.—Messrs. Moss (chair), Heidenreich, Heddle, J. and A. H. Harvey, Sexton, Tate, Heier, Short, Evers, R. and A. Whittlesea, McGlashan, Frost, Bagster, James, McNicol, Shepherdson, Sayers (Acting Sec.), and one visitor.

CLEAN WHEAT.—Mr. Heidenreich read a paper dealing with wheat in a general way. Having spoken of the undoubted excellence of Australian wheats as a whole and South Australian in particular, he spoke of the need of care to prevent the degeneration of wheats. Farmers should take a great deal more trouble, he said, to avoid marketing a lot of rubbish with the wheat. He produced a sample of grain which had been delivered to the buyer this season. He found in 1lb. of the grain $\frac{3}{4}$ oz. of drake and $\frac{3}{4}$ oz. of star thistle. This was equal to 5lbs. 10ozs. of weed seed to the bushel, or over 27bush. of rubbish in a parcel of 300bush. of grain. Before picking out the drake and stars the sample weighed 60 $\frac{1}{2}$ lbs. per imperial bushel, but afterwards it weighed 65lbs. per bushel. A sample of Comeback weighed 58lbs. per bushel, and after removing 1 $\frac{1}{2}$ ozs. of screenings, $\frac{3}{4}$ oz. of straw, chaff, barley, and smut balls per pound of grain, it weighed at the rate of 64 $\frac{1}{2}$ lbs. per bushel. He also cleaned 6,837bush. of wheat with cleaning machines. It appeared to be a good sample, and weighed 63 $\frac{1}{2}$ lbs. to the bushel. Nevertheless he removed from it 6,914lbs. of stuff, comprising 1,223lbs. chaff, 2,669lbs. screenings, 475lbs. sand and small stones and seeds, 1,472lbs. of smut dust (bunt spores), 790lbs. barley and oats, and 285lbs. of heads and straws. This was a total of over 115bush. of rubbish from the whole lot. After cleaning this wheat weighed 65 $\frac{1}{2}$ lbs. per bushel. Hence it could be seen that the standard of South Australian wheat could be brought up 2lbs. higher by cleaning it properly. [Surely the figures in regard to smut are wrong, as they show that in a good sample of wheat about 1lb. in each 280lbs. consisted of bunt. In view of the fact that bunt is so much lighter than wheat, this represents a very much higher proportion in matter of numbers.—Ed.] He was of opinion that dirty seed wheat was responsible for a good deal of the rubbish in wheat. Every farmer could procure clean seed wheat to-day, and there was no excuse for sowing inferior grain. The star thistle, or so-called Canadian yellow thistle, was a great nuisance where it had become established, and unless it was tackled it would become a trouble in large areas of the State. On the roads as well as on the farms numerous weeds should be destroyed, and in many cases the former were the breeding beds of most of the weeds. The writer then referred in the highest terms to the work of the department in milling wheats and cross-breeding.

EXPORT OF FLOUR.—Mr. Heidenreich also referred to the decrease in the quantity of flour exported to Java and Eastern ports from South Australia during the last few years.

In 1905-6 the figures were 67,306 tons, while in 1909-10 they were only 40,860 tons. This he said was accounted for by the fact that shippers in the other States were subsidised by the Government, and so they had an advantage and secured the trade. This should be dealt with at once, and if the subsidy could not be stopped in sister States the South Australian millers should be similarly treated by the local Government. It was foolish to wait until the trade had gone. South Australian mills had been idle for more than half their time during the past two years. A lively discussion followed. A member opposed the fixing of a high standard for our wheat, say 64lbs. to 65lbs., as from his experience of 20 years' wheat-buying he was sure the general average would never be more than 62½lbs., and it would mean that the bulk of the farmers would have to suffer a deduction in price. Mr. Jno. Harvey said there was no inducement offered to farmers to clean their wheat thoroughly, as the man with the dirty sample got the same price as the man with the clean one. Till there was a distinction made in favor of the clean sample there would be no improvement in the standard. Mr. Heidenreich did not think the wheat grown now was as good as that grown 10 years ago for milling. He was of opinion that it was forced too much by artificial fertilisers and did not mature properly. He thought that if a sufficient supply of hard, strong wheat like Comeback, to mix with softer wheats, could be relied upon, our standard of flour would be more satisfactory. As it was the quality varied, because it was impossible to get a sufficient supply of the best varieties to keep the quality up. He was of opinion that Comeback was the very best wheat for milling purposes. He did not consider bleached wheat inferior in any way to unbleached. Every miller bleached his wheat before grinding it, but the trouble was that when it was brought in bleached it was bleached twice. This did not refer to sprouted wheat, which was inferior.

Watervale, March 13.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. E. E. Sobels (chair), T. W. Sobels, Hamp, Davis, Scovell, A. and F. Burgess, Solly, Hunter, and Duke (Hon. Sec.).

GENERAL NOTES.—The Chairman referred to blight on apple trees. Other members also stated that the blight was very prevalent. Scalecide and most other treatments were ineffective. Sulphate of iron, it was stated, had been tried years ago and had done a deal of good. Limewash was also said to be a good check. *Oidium Tuckerii* was said to be very prevalent this year, and the Chairman cited instances where sulphur had been a cure and was very easily applied. Weeds.—A conversation took place on the prevalence of weeds this season. Sorrel was becoming a great nuisance in the fallow and was very difficult to eradicate. *Strangles* was mentioned as causing a lot of trouble among horses. Some cases had been very bad, and it affected the animals in various ways. Mr. Solly recommended hot bran poultices and plenty of opening medicine.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Paskeville, March 11.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. Price (chair), Pontifex, Cowan, Wehr, Goodall, Brinkworth, and Palm (Hon. Sec.).

WEIGHING WHEAT.—Mr. Pontifex read a paper on "Weighing Wheat." He said that some improvement on the present system of weighing grain was needed. Farmers took wheat to the station on a damp morning and wanted to get back to harvesting as the day warmed up. It should be possible to put the load on a weighbridge and take the net weight of the whole parcel of grain. Unloading could then be accomplished much more quickly than was now possible. On very windy days, many of which had been experienced last season, it was almost impossible to get the correct weight of a bag of wheat, as the wind affected the scales when balancing. With wheat weighed in bulk the farmer would receive credit for a good many half-pounds of grain for which he now got nothing.

Pine Forest, March 14.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. Johns (chair), Cameron, Schulze, and Barr (Hon. Sec.)

EXPERIMENTS WITH QUANTITY OF SEED AND MANURE.—Mr. Schultz reported the results of experiments he had conducted on 100 acres of crop as follows:—(1) 25 acres of Silver King wheat, 50lbs. to the acre, and 75lbs. super, result 78 bags; (2) 25 acres of Silver King wheat, 60lbs. to the acre, and 75lbs. super, result 78 bags; (3) 25 acres of Silver King wheat, 50lbs. to the acre, and 100lbs. super, result 86 bags; (4) same as No. 1, but harrowed when 4in. to 6in. high, result 70 bags. Mr. Shultz was disappointed with this plot. It continued green and fresh looking after the other plots turned off, and he expected a greater yield from it than either of the others.

POTASH.—Discussion took place as to the advisableness or otherwise of trying potash manures for wheat. The nugatory results in this direction at the Roseworthy College were advanced as a reason why it would not be worth while, against which the successes in some parts of New South Wales and Victoria were mentioned as incentives to some experimental work, and it was resolved to try a few bags.

Yorke town, February 11.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. I. Anderson (chair), Correll, Jung, C. Anderson, Bartram, Koth, Rechner, Domaschensz, Newbold, Aldenhoven, Heitmann, and Rohrig (Hon. Sec.)

TAKEALL.—A paper on "Takeall" was read by Mr. Correll. Having described the appearance of plants affected with this fungus, and outlined the course of the disease, he said the trouble had been more or less in evidence in South Australia for the last 40 years. A loose condition of the soil, brought about by ploughing in the stubble, seemed to favor it. Strong-growing oats, such as Algerian or Calcutta, and also peas, could be grown on land infected with the fungus. Apparently decaying vegetable matter with warmth and moisture aided the spread of the disease. Crops on the best land and that which was best cultivated sometimes fared worst, and those on new land were at times attacked. Summer rains, such as those experienced during the past two years, also appeared to favor the spread of takeall. Probably the best means of preventing the trouble was to starve out the fungus by growing crops such as oats, on which it could not live. Ploughing the land once and keeping the weeds down with sheep until seedtime often gave the succeeding crop a better chance than it would have on well-worked fallow.

WESTERN DISTRICT.**Elbow Hill, March 11.****PRESENT.**—Messrs. Dunn, Frith, Chilman, Ward, Wake, and Cooper (Hon. Sec.)

DRY FARMING.—The Chairman read a paper from the *May Journal*, 1908, on farming in dry areas in America, and discussion followed. Members agreed that the American methods could not be applied in detail to local conditions, but it was recognised that the principles underlying these methods could with advantage be studied, and the best practices for soils in this district ascertained by careful experimental work. For instance, it would not do to plough 5in. deep in this locality, and the tendency of some of the lighter soils to drift made it unwise to harrow very much. Mr. Dunn, however, said that he had found it quite safe to harrow east and west. The Chairman was not in favor of ploughing in stubble, as it was practically impossible to consolidate the seed bed if this was done.

Green Patch, March 9.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. G. Sinclair (chair), Gore, Merchant, Whillas, Chapman, J. R., and P. Sinclair (Hon. Sec.)

HOMESTEAD MEETING.—This meeting was held at the homestead of the Chairman. Members partook of excellent samples of peaches, and almonds. One of the almond trees was so heavily laden that the limbs had given way under their burden. It was considered that practically all the lower portion of Eyre's Peninsula was admirably adapted to fruit-growing.

Koppio, March 15.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. G. B. Gardiner (chair), G. and M. Howard, Newell, M. Gardiner, Brennand, and Richardson (Hon. Sec.).

HOMESTEAD MEETING.—A homestead meeting was held at Mr. Howard's to inspect his orchard. He had put in about 800 trees, and they were now from three to five years old, and had in most cases made excellent growth. Last year he had tried manuring some of the garden with Adelaide Chemical Works Company's special manure, and a marked improvement was noticed wherever the manure had been used.

Miltalie, February 14.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. Jacobs (chair), Ramsey, Kobelt, W. G. and E. P. Smith, J. P., I. W., and E. Story, Wilson, Hier, (Hon. Sec) and three visitors.

OATS AS A PAYING CROP.—Mr. Jacobs read a paper setting forth the advantages of growing oats. He considered a great deal more ground should be sown with this crop in this district. Although the oats were much more trouble to harvest than wheat, a good crop of them could be grown where wheat would not do well. This was a great consideration where there were mallee shoots to deal with, as the stubble burned well, and two good stubble burns just about finished off the shoots. The land seemed to be improved by oats, and a heavier crop of wheat could be grown if the soil carried a crop of oats now and again. Some of the poor sandy soil of this district would not grow anything other than oats at first. Oats should be sown early, say in April or the beginning of May, so that they would root well before the coldest weather set in. A farmer should sow just as large an area as he considered he could harvest, bearing in mind that it was a crop that was liable to shake out. As a crop to market, oats paid as well as wheat. Last harvest he took off an average of 35bush. of oats per acre, while the wheat only averaged 10bush. per acre. Oats were needed on the farm as horse feed, and oaten hay was good if not too rank. Should the crop blight off at all, or be stunted, the stubble would make first-class feed for loose stock. He also considered it wise to sow a small area with Algerian oats. A good general discussion followed, in which members were of opinion that Algerian oats were the best for this district, both for hay and grain. They agreed that a good deal more land in this district might well be sown with oats.

IMPORTANCE OF BREED IN DAIRY STOCK.—The following paper was read by Mr. Wilson:—"Some farmers and dairymen still hold that the butter return depends on the quality and quantity of the food given to the cow. It is not so. A cow will naturally yield milk of a certain quality, *i.e.*, up to a certain standard or percentage of butter fat, and it cannot be improved above that, no matter what the feed is. It is just possible that a ration rich in fats may give a slight increase in the percentage of butter fat for a short period, but the cow soon goes back to normal. If we wish to increase the butter yield it must be done by breeding up. Feeding up will never do it. Of course we must assume that a sufficiency of food is being obtained by the cows. A cow only has a certain capacity for the assimilation of the food, and a still more defined and limited capacity for returning the fat in the milk. Dairymen must test their cows systematically. Keep only the best. Procure as good a bull as possible from a milking or butter-producing strain. Continue to cull out the inferior cows, breeding only from the best. It will not, perhaps, be advisable to go in for pure-bred stock altogether, though the bull should be pure. It is generally sufficient to mate a good pure-bred bull with the best cows already owned. A cross of a milking strain of Shorthorns and Jerseys is best, or Ayrshire and Jersey. The crossbreds have a strong constitution. If butter is the object, the Holstein had better be left alone. Their percentage of butter fat is low; they are heavy yielders of milk, and they have large frames suitable for beef when past milking. I am of opinion that before long the large majority of our dairy cows will be a milking strain of Shorthorns. That breeding is more important than feeding in the production of quality is more clearly seen in horses, while it is true of all kinds of stock and plants. With horses 'blood will

tell.' Having due regard to soundness and hardiness, the better bred a horse is, blood or draught, the better for size, quality, stamina, and value he is. There is an indescribable something about well-bred stock that is pleasing to the owners. They cost no more to keep, and will do more work than ill-bred horses, and how much more valuable the mares are for breeding from. For trap horses and hacks the more pure blood in them the better they are for pace and endurance. In sheep, improved breeding quickly leads to increased quality, quantity of wool, and enhanced profits. Egg production is increased more by breed than by feed, as is also the quantity and quality of bacon. In regard to cereals, if we want to increase our yield 5 bush. per acre we must search out a new wheat capable of making better use of the food provided. Then, given good cultivation and the necessary plant food, we shall get an increased yield, which we should never get from an old, light-yielding wheat, however well cultivated, or however abundantly the plant food was supplied." Considerable discussion followed. Members were agreed that good feeding was of little value without good breeding; on the other hand, sufficient feed must be provided to keep all stock in the most fit and useful condition.

Miltalie, March 11.

(Average annual rainfall, 14 in.)

PRESENT.—Messrs. J. S. Jacobs (chair), F. Jacobs, Ramsey, J. P., I. W., and E. Story, Alm, Kobelt, W. G. and E. P. Smith, J. A. and M. J. Laffin, Hier (Hon. Sec.), and five visitors.

FARM LABOR.—Mr. Laffin read a short paper dealing with the relationship between the farmers and the men they employ. He thought that farmers should be prepared to pay good wages for good men. Comfortable quarters should be provided and kept clean, tidy, and habitable, just as they would for any members of the farmer's household. Matters should be so arranged that farm hands had not to work out in the rain, but could be kept busy doing odd jobs under cover. The man should take a keen interest in any horses under his care, and look after their shoulders. He should arrive at the stables at 5.30 in the morning, and, having attended his horses, leave the stables at 7 o'clock. Finally he thought that if farm hands were better looked after there would be less trouble to obtain them. Considerable discussion followed. Some members thought that to look after the employes as thoroughly as suggested in the paper the farmers' wives would need extra assistance. They agreed that shelter should be provided in the paddocks, so that the mid-day meal might be taken in comfort. One of those present had seen a light portable house which could be placed where desired to provide the shelter needed.

Mitchell, March 11.

PRESENT.—Messrs. D. Green (chair), Sampson, McCormack, J. Green, Jericho, Dorward (Hon. Sec.), and one visitor.

WATER SUPPLY FOR FARMS.—The following paper on this subject was read by Mr. Jericho:—"Where water has to be carted long distances it will very soon cost the price of a dam or a well. In this hundred it is difficult to obtain water by well-sinking. Therefore dams should be put down, as clay can be found on most blocks. A dam, 30 yds. by 30 yds. and 8 ft. or 10 ft. deep, would be sufficient to water up to 20 head of stock all the year, and would not cost more than about £30. The slopes of a dam should never be made steeper than 1 in 3, and one side could be made 1 in 5 for stock to water. Where clay cannot be found right at the surface the clay from the bottom of the dam can be used for the banks, &c. From 6 in. to 8 in. of clay spread over the surface will very soon hold, and will improve as the dam gets older. A very useful implement for excavating is a buckscraper. It is cheap, has very little wear, and no breakages. A single-furrow plough should be used, and it is best to plough only a small piece at a time, as the horses tread the soil down again if much more is ploughed. This work should be done in the summer, while the ground is dry, as it is too hard on the horses in wet weather. A windmill and troughs are by far the best means of watering stock where they can be afforded. The cost is not very great, and the water will always be clean and can be used for domestic purposes." In the discussion which followed, members were of the opinion that it was best to make a dam at the start on a new farm, as the amount it cost would not go far in carting water long distances over bad roads. They agreed that the use of the mill was advisable, as where a lot of cattle were watering they polluted the water to a great extent.

Penong, February 18.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Miller (chair), Stiggants, Grand, Wold, J. B. and J. Oats (Hon. Sec.).

RABBIT DESTRUCTION.—The following paper on this subject was read by Mr. Stiggants:—"Rabbit destruction is a work that the farmers have to attend to on the West Coast. I think the present time of the year is the best for killing this pest. We can destroy as many rabbits in one day during the summer months as we can in a week in the winter. The first thing to do is to take the poison cart round all the paddocks, inside and outside, a few days before starting to fill in the holes. The rabbits take phosphorus very well at this time of the year. Next, we require two or three men to chop down the burrows and fill them in with a large heap of loose earth wherever there seem to be a number of rabbits. Several dogs are needed to assist the men in catching the few rabbits that are to be seen through the stubble and grass paddocks. Raspberry jam with strychnine mixed with a little pollard put on sandalwood twigs is a very good bait, and the rabbits generally see anything fresh in the paddock. It is also necessary to go round the netting every day, to prevent more rabbits from getting in and opening the holes which have been filled. In the winter time rabbits will not take poison so well, and I therefore think it advisable for each farmer to have five or six dozen traps on hand. He can put them through the wheat crop if the rabbits are damaging it. Several dogs are still needed to round up the stray bunnies, and they will find a few nests of young ones." Mr. J. Oats thought strychnine on sandalwood twigs, or phosphorus and pollard, was preferable to jam, as jam became dirty, and then the rabbits did not take it freely. He was going to try bisulphide of carbon placed on wool or cotton waste in the holes in tins. The poison-cart was needed to distribute pollard and phosphorus, as other methods were slow and not so effectual. The Chairman thought the poison cart very successful. Mr. Grad said rabbit destruction was one of the most important items for the farmers to deal with, and thought Mr. Stiggants had summarised the most practicable method of dealing with them in this district. The poison cart with pollard and phosphorus was simple and effectual. Traps were very useful during the winter. Mr. Wold thought it very necessary that the netting should be kept in good order. If it was not erect the rabbits could get over. He thought only 1½ in. netting was really successful in keeping them out. He had tried dynamite for destroying the burrows, but found it very expensive. Pieces of netting placed over the holes had prevented the rabbits from getting out. He had found sandalwood twigs and strychnine useful around the netting. Bran was preferable to pollard for mixing with phosphorus. Mr. J. B. Oats thought the poison cart the best method to employ first, after which he would fill up the holes well with a shovel. The netting should be 3ft. 6in. high, instead of 3ft. as generally used. It would then prevent the rabbits from getting over, and it could be put 6in. into the ground.

Penong, March 11.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Brook (chair), Grad, Farrelly, Wold, J. B. and J. Oats (Hon. Sec.), and one visitor.

FARMING IN MALLEE COUNTRY.—A paper on this subject was read by Mr. J. B. Oats. Having secured the land and stock, he said, the first consideration was the provision of water. He preferred well water, but if it was not practicable to obtain this, tanks should be put down where there were good runs. Scrub should be rolled down where possible, but if too big some axe work would have to be done. Next he would erect house and stables near the centre of the block. The former should be of stone and the latter of iron. The stables and chaffshed should be on a gentle slope, to facilitate drainage, and preferably should face the east. A tank for drinking water should be placed at one end. All buildings should be put up neatly from the start. Before burning a scrub the timber should be thrown in from a strip about half a chain wide, all rubbish cleared off, and the belt ploughed right round the rolled portion. A day with a good hot wind should be chosen to burn the scrub. As soon as the land had been cleared up it could be ploughed ready for seeding. He would drill in 35lbs. to 40lbs. per acre of well-graded seed and a little super. A plot of oats as well as wheat would be of considerable value for hay. After seeding fencing should be attended to. Where obtainable teatree posts should be put not less than 18in. in the ground, and from 12ft. to 15ft. apart, with a strainer at each fortieth post. Netting should be 3ft. 6in. wide, and put well into the ground. A No. 8 galvanized plain wire was best to attach to the top of the netting. This, with a barbed wire on top of the posts, would be a very effective fence. Paddocks should not be larger than 250 acres each. They should run as near to the homestead as possible to facilitate removing stock

from one to another. He thought the stripper best for harvesting, on account of the saving of the chaff. Considerable discussion followed. Mr. Farrelly thought spring water was better than water caught from the surface. He agreed that it was best to erect a comfortable home at the start, but sometimes it was not convenient to place the house in the centre of the block. He thought 15ft. rather far apart for the fence posts. It might do for the out paddocks, but he preferred 12ft. apart near the homestead. Mr. Grad considered that as there was no guarantee that water could be obtained by well-sinking tanks were safest. For the sheds and stable he preferred the iron roof to straw. Although straw was cooler, the horses were seldom in the stable in the day time, and iron provided a better shelter. He thought it required the heart of a lion to tackle heavy scrub with an axe. If the scrub was light the roller was the better way to deal with it. Stone was better than iron for the house, but was not always procurable. He would build the front rooms first, as it could be added to, and the extra outlay necessary to build a gable instead of a skillion was not much more. Mixed hay was good, but as the rainfall was often deficient it was best to sow wheat and oats separately so that if the yield was not good enough to cut for hay the crop could be reaped. The Hon. Secretary thought spring water preferable to surface water, as frequently drainings from the stables and other impurities polluted the water. Water caught from the iron was much better, and there was less danger from disease. He believed a lot of the diseases in horses such as worms, were caused through the horses drinking the water from the bottom of the tanks. Other points of the paper were agreed to by the speakers.

NEW WHEATS FOR DISTRICT.—Some discussion took place regarding the trial of wheats not generally grown in the district, and it was thought that members would be well advised to procure some varieties which had done well in other parts.

EXHIBITS.—The Chairman tabled some fine samples of melons, potatoes, and beet, grown on his farm in low-lying land

Shannon, February 11.

PRESENT.—Messrs. G. W. Proctor (chair), Glover, Fleming, W. M., L. E., and E. B. Smith, H. Proctor, Gordon, and J. and J. J. Cronin (Hon. Sec.).

PREPARATION FOR SEEDING.—Mr. H. Proctor read a paper under this title to the following effect:—"Now that the harvest is completed, farmers should at once have the plough or cultivator at work so that sufficient land may be prepared to put in the desired quantity of crop at the right season. Where a good burn has been secured I would plough a strip around the paddock to prevent the ashes from drifting away, and I feel sure that an excellent piece of crop would stand on the strip so treated. I am strongly in favor of using the plough on new land, as, in my opinion, this implement makes the best seed bed; 3in. to 4in. is a fair depth for this district, and if so worked the plants will root well. Stubble land ploughed in dry weather should be allowed to stand until after a good rain, and then should be cultivated before the seed is drilled in. This practice had given me good results during the past two years. Fallow ground also gives better returns if worked up in this manner before seeding. The more we work the land the sweeter it will become, and at the same time the more quickly the mallee stumps will be cleared. I commence seeding, if possible, at about the middle of April. The first crop put in is usually oats, a crop of which every farmer should have a fair quantity to cut for hay. The oat crop will pay for a dressing of 100lbs. to 120lbs. of super. per acre; in fact, I am strongly in favor of a good dressing of super. in this district at any time. Yandilla King and Dart's Improved are good wheats to commence with. Federation is a good mid-season variety, and some of the early kinds should be sown at the finish." Mr. Smith was not in favor of ploughing new land too deeply, especially if there had been a good fire over it. Just deep enough to keep the ashes in the ground was sufficient. He favored a smaller quantity of manure than advocated in the paper, say, 80lbs. or 90lbs. He would commence seeding at the beginning of April instead of the middle. Mr. Fleming would always harrow after sowing, as it was essential that all the seed should be covered. The Chairman would break new land with the cultivator, as he had tried both cultivator and plough and had equally good results from the former.

QUESTION BOX.—In reply to a number of questions the following opinions were expressed, viz.:—That a practical man with a farm plant and £500 capital should have no hesitation in commencing farming in a new district. That it certainly paid to rake and burn shoots and get the ground as free from rubbish as possible before seeding. That clean straw, if fairly long, was a good covering for a haystack, but in the opinion of most members iron was better still and worth the initial outlay. That it paid to grade wheat for seed, not only because the larger grain would be likely to produce a larger and more

vigorous plant, but also because screenings and other stuff in the sample, instead of dirtying the land, could be used as food for some of the stock on the farm. That mallee shoots, when once cleared, should never be allowed to grow very large again but should be burnt whenever possible by a stubble fire. If the straw would not burn without it a fire rake should be used. An 18ft. rake could be purchased for £6, and was worth the money. Shoots could be cut every year whether the land was cropped or not. They were much more easily dealt with when only one year old. King's Early was one of the best wheats to sow with oats for hay, as it was very sweet, while oats were liable to be bitter if not cut at exactly the right time.

Utera Plains, March 11.

(Average annual rainfall, 14in.)

PRESENT.—MESSRS. Gale (chair), Stephens, Hornhardt, A. and C. Venning, J. and M. Abrook, Naughton, Sinclair, Chase, Branack, Ramsey (Hon. Sec.), and ten visitors.

DIFFICULTY OF PROCURING LAND.—The Hon. Secretary read a paper in which he suggested that the work of the Land Board might be facilitated by co-operation on the part of the Agricultural Bureau. He suggested that each Branch should appoint a committee of, say, six members to investigate the qualifications of those in the district who were desirous of obtaining land, and if they were competent to work a farm in a practical and creditable manner, to forward their names with a recommendation through the Advisory Board. Applicants who were deemed to have had insufficient practical experience could apply again after a further period of six to 12 months. After considerable discussion, in which the Chairman mentioned that he knew of a man who had applied for land 14 times without success, while other men held the land for speculative purposes, it was decided to commend this paper to the Advisory Board with a view to ascertaining the feeling of the other Branches in regard to the matter. [This suggestion seems quite impracticable. The Bureau has no official standing in the matter, and apart from the delays which would occur if applicants' qualifications were referred to the Branches for investigation, it is most probable that the applicants themselves would raise strong objections to the course suggested.—ED.]

Yadnarle, March 11.

PRESENT.—MESSRS. Schubert (chair), C., F., G. A. J., and T. C. Dreckow, E and J. Kruger, F. W. and A. Jericho. Brown, Weiss, Spriggs, Mowat, Marsham, R. B. and J. J. Deer (Hon. Sec.), and two visitors.

HARVESTING MACHINERY.—Mr. Howard read a paper on "Harvesting Machinery," and at the outset said that while he could not claim extensive experience in harvesting, he deemed it a duty of members when asked to contribute papers or addresses to do so. He thought all should be prepared to help in this way, and by criticism and keen discussion. The paper then ran as follows:—"The three chief means of harvesting are undoubtedly the harvester, stripper and winnower, and the binder and thresher. According to reports there will be a fourth, viz., the reaper-thresher. The first seems to be the most popular, mainly on account of the saving of time, for time means money to the farmer. For a 5ft. cut a fair average is from 10 acres to 12 acres per day, so that with a harvester one could reap, say, 300 acres in four to five weeks. The cost of a 5ft. harvester is about £70. A few of the drawbacks, as far as I could tell in one season's experience, are that the land is dirtied a little more than with a stripper; but if the stubble is burnt, in the end there is no difference. The wheat is left lying out in the paddocks the whole of the time, and besides losing weight it is liable to be scratched out by birds and the bags tackled by mice; also the bags rot at the bottom. On the advantage side, as with the stripper the stubble is left, and stock can be run on it for a considerable time. It is a matter for dispute which loses the more weight, stripper or harvester, and also whether the harvester or winnower cleans the wheat better. Both lose wheat through the combs, and with the harvester perhaps a little gets blown out, while with the stripper there is always a little left on the floor after cleaning. It is rather hard to draw a comparison between the cost of stripper and harvester. A stripper and hand-winnower would cost about £76, which is £6 more than the harvester; but, whereas only three horses are required with a stripper, four or five and sometimes six are used with the harvester. The stripper could take off 300 acres in very little more than the harvester, but then the wheat is still to be cleaned; this is a lengthy job with the hand-winnower. For this extra labor one gets the cocky chaff, which would doubtless be a great asset on a new farm. But it appears as though it would pay rather to cut hay and do some other job with the time that would be spent on wheat-

cleaning. The third is the binder method. This way is very popular in the South-East, where the season is a much more rainy one than here. This makes the straw a better fodder. The manager of the Wagga (New South Wales) Experimental Farm gives the following seven reasons why wheat should be harvested with reaper and binder:—(1) It is possible to place in a position of security a crop or a considerable portion of it while it is far less liable to damage than when it is left to ripen sufficiently to render possible other methods of harvesting. (2) A crop is in a condition for cutting about a fortnight earlier than is possible for stripping, and the work of cutting may proceed under weather conditions unfavorable for the latter work, thereby saving time. (3) When a crop is allowed to ripen to the degree necessary to admit of stripping one day's hot wind may cause the loss of the entire standing crop, while such conditions would be harmless to stacks, and comparatively so to wheat in stooks. (4) Much less grain is shed during the cutting of a crop which is seasonably dealt with than is the case when the stripper is used under its most favorable conditions, and the binder removes and includes in the sheaves the whole of the ears, while in an irregular crop many low heads are missed by the stripper. (5) The weight and color of the grain which has been cut and stacked are superior to that harvested otherwise, as in the latter case bleaching and loss of weight are inevitable. (6) Land upon which crops have been cut will always be found freer from wild oats and weeds, as such plants are to a great extent removed in the sheaves and dealt with in threshing. (7) The value of the straw is always worthy of consideration, as no matter how long it has been kept periods will occur when its value will be considerable. These seven reasons make an imposing array in favor of this method. This year we heard of the trial of the reaper-thresher, but so far, according to reports I have received, it does not seem an unqualified success. It is at present a very expensive implement to experiment with. They will need to be great time and crop savers to be worth their price, viz., one and a half times that of the well-tried harvester. When I start farming the machine that I shall get will be the harvester, and an Australian make, unless the reaper-threshers give a better account of themselves to warrant one in purchasing them." Discussion followed. The members were unanimous in the opinion that the harvester was the best means of dealing with the crop in this district. It was considered by some of the members that in the new districts, where the land was of a sandy nature and there was absolutely no feed, that the stripper was the best for the first year or so, as the crop could be harvested with less horses, and the chaff was of considerable value.

PICKLING WHEAT.—Mr. Brown asked whether fungusine was a surer preventive of smut than bluestone. Messrs. Schubert and G. Dreckow spoke very highly of fungusine. They had used it last year and were very pleased with the result.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Forster, February 18.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. J. Searle (chair), W., E., and H. Towill, W. Searle, Hayman, and Neares (Hon. Sec.).

MOTOR POWER FOR FARM WORK.—A short paper on this subject was read by Mr. H. Towill. The scarcity of labor experienced at the present time, he said, compelled farmers to procure labor-saving appliances of every description. A three and a half or four B.H.P. motor engine would be powerful enough to pump water from any well in this district. It would also drive a No. 4 chaffcutter, thus saving four horses and a man's time to attend to them. A crusher, winnower, grader, cream separator, and practically every other stationary machine on the farm could be worked with the same engine. He thought that in the near future this power would also be applied to machinery for harvesting wheat. With a two h.p. motor he had cleaned 640 bags of wheat, using only a case of benzine, and was able to clean and sew 40 bags of wheat a day, on an average, without any assistance. The engine gave great satisfaction, and any farmer who could not obtain a man would be able to clean his own wheat with the aid of such an engine. It turned the winnower more evenly than hand power, and probably the cleaning machine would last longer as a result.

MIXED FARMING.—Mr. Luxom read a paper, in which he said that during the past favorable seasons many farmers had all their energy put into wheat production, and had neglected many side lines which could be profitably worked. It would pay in this district to prepare a piece of land with a good dressing of stable manure, and in it grow vegetables for household use. Farmyard manure should all be put to good use, instead of being allowed to waste. Every farm should carry enough sheep for the mutton supply, and they would be found very useful in keeping the fallow clean. Their clip of wool would also bring in money. The improvement of the soil resulting from keeping sheep, and the alternate system of cropping, would bring about an increase in the wheat yield. A few cows and some pigs to consume the skim milk would, together, be found very profitable. The cows would pay for the upbringing and keep of the pigs, and the revenue from the latter would be clear profit.

Morgan, March 11.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), Heppner, Hausler, R. Wohling, jun., Pope, Hampel, Marshall, H. Wohling (Hon. Sec.), and three visitors.

MIXED FARMING.—The Chairman's paper on this subject (which will be found on page 814 of the March issue) was re-read and discussed. Mr. R. Wohling, jun., thoroughly believed in keeping sheep on the farm; the grass grew much better than where there were none. Mr. Hausler was convinced that mixed farming was best in this district. A man should keep horses, cattle, sheep, pigs, and poultry in addition to growing cereals. When something of a failure was experienced in any one line the others would then keep things going. Messrs. Pope and Marshall spoke in a similar strain. The Secretary spoke of the money to be made in horse-breeding. Farmers were well able to breed a few horses, and if the farms were cut up into convenient-sized paddocks, so that the grass had a chance of growing, all class of live stock could be made to pay. Finally a resolution was passed affirming the principles laid down in the Chairman's paper.

DESTRUCTION OF RABBITS.—Mr. Hausler reported excellent results in poisoning rabbits with "vermox." He lived near the river, and the rabbits were a great nuisance. His method was to spread the poison over the burrows and in the tracks, and in a few days he found that thousands of rabbits were killed. Other poisons had been tried, but none of them gave such successful results as this.

Parrakie, February 25.

PRESENT.—Messrs. F. J. Dayman (chair), Diener, Hall, Gravestocks, Schmidt, Boelitz, J. Dayman, O. and C. Heinzl, Neindorf, Morrisson, Lee, Bottroff, Burton (Hon. Sec.), and 11 visitors.

FARMING IN MALLEE COUNTRY.—A paper on this subject, dealing more especially with the Pinnaroo district, was read by Mr. Hall. The first task for the settler, he said, was to get the scrub down by means of a good heavy roller, breaking it down as thoroughly as possible. When it was dry enough to burn well, a good day should be chosen to set it alight. The ashes should be turned in with a share plough, and the ground left till seeding time. Oats should be grown the first year to get a good stubble burn. The following season wheat could be sown with 10wt. super. per acre, and a third good burn should be secured when the crop had been taken off. These three fires would just about finish the mallee shoots, and they were probably the settler's greatest difficulty. Very little discussion took place, but Mr. Schmidt said he would plant wheat for the first crop in preference to oats.

MORE HORSE FEED AT SMALL COST.—The following paper was read by Mr. Lee:—"In mallee country, where grass and herbs are of no use for horse feed, I have found a simple way of obtaining 60 tons more chaff at a very low cost by using the binder and heading machine. I cut 15 acres of hay more than usual, just as the grain was plump, but before the flag had dried off the stalk. I stooked it, putting about 10 sheaves to each stook, and left it to ripen for nine days. After this, by use of the header, I obtained 60 bags of wheat, which I sold at $\frac{1}{4}$ d. a bushel under market price. The straw, which was still nice and green, was mixed with 10 tons of wheaten hay, making 65½ tons of chaff. With this I fed my horses, and they did their work and looked as well as if fed on the best of chaff." Members agreed that this was a good way for a new settler to provide sufficient feed for his horses. Mr. Jaensch said 3qts. of oats was as good as a bag of chaff for a horse.

Walkerie, March 13.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Lewis (chair), Bruce, Emmett, Burton, Green (Hon. Sec.), and one visitor.

FREEDING HORSES.—Some discussion concerning the proper feed for horses took place. Mr. Bruce said that during the short time he had been in the State he had taken notes as to how horses were fed. Most farmers in the districts he had been in gave cocky chaff to their horses before taking them out to work. He said no farmer worthy of the name in the old country would think of working his horses without a good feed of oats. He thought they should have a quart of good crushed oats morning and noon night, and should have plenty of water. All farmers should grow oats for horse feed. Mr. Burton, while recognising the food value of oats, said that they would not grow well on sandy soils. They required stiffer soil.

Wilkawatt, December 12.

PRESENT.—Messrs. Bowman (chair), H. and O. Arhns, Altus, Neville, Ivett, and Harvey (Hon. Sec.).

CARE OF MACHINERY.—A short paper on this subject was read by Mr. Altus, as follows :—
“As farm implements and machinery are a very expensive item in the equipment of a farm, it behoves all farmers to take the utmost care of machines when working, and see that they are well protected from the weather when not in use. Before taking a machine into the paddock to work, all nuts should be tightened, and care taken to ensure the bearings being in good order, taking oil properly and working smoothly. It is much easier to do these things when the necessary tools are at hand. Use oil freely. Heavy machinery oil is best, as it will not run through the bearings too quickly. Discard all oils of a sticky nature. When working new implements see that all nuts are screwed up properly till the working parts are well seated. When the season is over, store in a good shed, take note of any new parts you may require or any improvements that can be made, and see that these are fixed up before the next season comes round.” Members agreed that the advice given in the paper was sound.

SOUTH AND HILLS DISTRICT.**Cherry Gardens, February 7.**

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. Chapman (chair), T. and A. Jacobs, Mildwater, C. and I. Ricks, Stone, Strange, Scroop, C. and J. Lewis, and Curnow (Hon. Sec.).

PROFITABLE CABBAGE.—Mr. Ricks said that six months ago he cut a cabbage weighing 20lbs. without the big leaves. Three weeks ago he cut another heart from the same stump weighing 15lbs. The plant also ripened a crop of seed, and was at present carrying another head of good quality.

COWS EATING RABBITS.—Mr. Jacobs reported a curious incident of cows eating raw rabbits. His boys went out shooting, and having shot and gutted several rabbits planted them beneath some logs until their return homewards. On coming back, however, they were surprised to find that some cows were in the act of devouring the last of the bunnies when disturbed. He had heard of cows eating the remains of old dried up bodies, but never of newly killed animals.

SUMMER PRUNING.—Mr. A. Stone asked for information on the summer pruning of fruit trees. He had followed up the practice for several seasons, but he now found the middle of his tree densely filled with young growth, but no fruit. Mr. Curnow's experience was as follows :—One year he summer pruned 600 apple trees during the first week in February and the trees afterwards grew as much as 18in. where pruned. The next year he pruned the same trees in the first week in March, but in this instance they made not the least bit of growth. The latter pruning was done during a dry autumn, whereas the first was followed by heavy rains. The weather experienced during January and February had much to do with the success or otherwise of summer pruning.

APPLES.—Mr. Ricks had some young Cleopatra apple trees, now four years of age, and asked whether they were too young to be allowed to fruit. Mr. Curnow thought that if the main arms were strong enough to carry fruit without being unduly drawn down there was no reason for disallowing fruit to set.

"JOURNAL OF AGRICULTURE."—Mr. C. Ricks initiated a discussion on the *Journal of Agriculture*. He highly praised the manner in which the *Journal* had always been edited. The farmers owed much to the paper for the earnest manner in which it had advocated the use of phosphates on wheat lands, as recommended by Professor Lowrie. The *Journal* contained trustworthy articles by expert writers, and was a boon to all husbandmen. The local branch of the Bureau had always been fairly treated by the *Journal*. Mr. T. Jacobs commended the minuteness of detail and carefulness with which statistics in connection with experimental works were tabulated. He believed that even a novice in farm work could, if he thoroughly studied the articles in the *Journal*, become an efficient agriculturist. Mr. A. R. Stone also commended the paper. Mr. Curnow said he would like to see the *Journal* take up the subject of insect and animal life about the home. If men like Mr. Tepper and Mr. Zietz could be induced to write on the subject he was sure their articles would create widespread interest. The State schools did a good work in this respect, but their teachings were only of an elementary nature. What was needed was advanced scientific writings on beetles, moths, flies, &c., also on bird life. The *Journal* had a circulation of 5,000 copies, so that it probably entered more than half that number of homes. The speaker had been interested in collecting beetles for the past 25 years, but had always found a difficulty in getting reliable information on the subject. It was easy enough to get good textbooks on English beetles, &c., at a moderate cost, but not Australian. If possible the column could be made open to correspondence so that young collectors could write for information, &c. The Commonwealth was sadly lacking in such works. He thought it an advantage for the producer to know the life history of the animal life around them; besides, the matter was an educational one. He knew of several lads in this district who were keenly interested and needed only a helping hand. Mr. Ricks was much impressed by the suggestion, and moved that the Cherry Gardens Branch requests through the Advisory Board that something along the lines suggested by Mr. Curnow be carried out. This was carried unanimously.

Cherry Gardens, March 14.

(Average annual rainfall, 35.3in.)

PRESENT.—Messrs. Chapman (chair), T. and A. Jacobs, J. and C. Lewis, Mildwater, C. and I. Ricks, Brumby, Hicks, Stone, Strange, Curnow (Hon. Sec.), and five visitors.

COLT-BREAKING.—Mr. T. Jacobs initiated a discussion on colt-breaking. "In breaking-in a horse," he said, "local conditions had to be considered, such as the nature of country where pastured, roads, &c. Begin by gently stroking the foal down, on the first day of its birth if possible; then handle and teach to lead with bridle; study what food is suitable for it, and quickly teach it to feed from a little noschag; lift its feet and tap its hoofs, etc.; continue to handle it in this way, always gently but firmly; never appear afraid of it; and by the time it was of the age to be put to work it would require very little 'breaking-in.' If a man bought an unbroken colt it would pay to adopt gentle measures from the start. Shying and jibbing were the result of improper education. If horses were educated to an open bridle none of them would shy. Very few would jib if put with a good reliable horse. Never expect the young horse to do all the work. See that the collar was a good fit—it prevented galls. If a young horse flinched when put in a team it would be found that the harness was illfitting. Some horses would not tie up, but would break away; this habit could be broken. Fit a new branbag around his neck and let him have a tug. When he found that escape was impossible he would give up the struggle. If a kicker were tied up with a branbag and touched behind with a loose bag on a stick and made to kick he would soon give up the habit. Talk to a horse and he would become more tractable, and would take more kindly to his master. Five years of age was quite early enough to work a horse, and its working life would be much longer than if broken in at three years of age. Mr. J. Strange quite agreed with the views expressed in the paper. He had worked a horse for several years in an open bridle and knew the advantages. Mr. Ricks thought that six years was the correct age for work to begin. Mr. Hicks never mouthed a horse, but caught it and put it straight into the trolly. He agreed with Mr. Jacobs that it was an advantage to educate from birth.

APPLE TREES LOSING LEAVES.—Mr. Jacobs asked for information respecting the premature falling of leaves of young apple trees. The leaves curled up, got dry around

the edges, and finally fell, leaving the branch bare. Mr. Ricks thought that owing to the mild season the growth had been soft and tender, and when a few really warm days came the leaves were burnt. The Hon. Secretary thought that fusiciadium was probably the cause. Many branches on his own young trees showed similar signs, but where the trees were treated with bluestone mixture nothing of the sort occurred and the trees had done much better. All the fruit spurs were better protected with foliage than on the unsprayed trees. Messrs. Chapman and Lewis thought that fusiciadium was the cause.

Forest Range, March 22.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. Waters (chair), Collins, H. J. and E. Green, McLaren, Vickers, and Monks (Hon. Sec.).

PROPOSED GOVERNMENT PULPING PLANT.—A meeting of fruitgrowers was held under the auspices of the Branch to consider the erection of a pulping plant to overcome the low prices for jam fruits, and the following resolution was carried:—"That, in the opinion of this meeting, the fruitgrowers should pledge themselves to loyally support a Government pulping plant, &c., if such be established, by guaranteeing a sufficient supply of jam fruits, say for 10 years." The following prices were suggested as fair:—Plums (dark), 2s. 6d. per bushel, and light 3s. per bushel; raspberries at 2½d. per pound; blackberries, 2d. per pound; gooseberries, 2s. 6d. per bushel for jam-making, and 3s. per bushel for canning purposes; Duchessa pears, 3s. per bushel for canning purposes. All prices for fruit delivered at depot. It was also decided to forward a copy of the resolution to the various branches of the Fruitgrowers' Association.

Hartley, March 11.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Wundersitz (chair), Brook, Hudd, Symonds, Clark, Pratt, Phillips, Birmingham (Hon. Sec.), and two visitors.

FARM LABOR.—A paper dealing with this subject, written by Mr. Stanton, was read by the Hon. Secretary. The writer said that a good man, well paid, was always cheapest. Inexperienced workers sometimes cost the farmer a great deal, and it sometimes took a lot of the farmer's time to teach a man his work. These facts pointed to the advantage of having a permanent hand on the place; but nevertheless he thought the holdings in this district could not at present profitably maintain the farmer, his family, and also pay the wages of a man all the year. While the present labor conditions ruled he considered the most profitable way to farm was for the owner to cultivate only as much as he could deal with himself, and utilise the remainder of the farm for stock-raising or let it on the share system. Members agreed that it did not pay to keep a man all the year on a farm of 300 acres, but on larger areas they thought it would. It was always best to get a good man and pay good wages.

HEAVY WHEAT.—Mr. Brook tabled some Petatz Surprise wheat weighing 67½lbs. to the bushel. This was thought very good for this season.

Kingscote, February 13.

(Average annual rainfall, 18½in.)

PRESENT.—Messrs. Turner (chair), Castine, Wallace, Bell, Jacka, K. and A. Nash, Wood, Chirgwin, Cook (Hon. Sec.), and five visitors.

EXHIBITS.—General discussion took place regarding the quality of the following exhibits. The Chairman tabled two splendid specimens of Fordhook squashes weighing 31lbs. and 28lbs. respectively; also two Tripoli bush marrows, and nine One-man marrows. The large squashes, members said, were the best variety of squash for eating. Mr. K. Nash tabled a fine growth of maize 8ft. high; it was very young and there was no sign of the cob. He also tabled some Old Purple Straw wheat in the ear, and a sample of Blackeye Susan pea. Mr. Nash stated that owing to the wet season the peas were bogged, yet they gave a return of seven bags to the acre. The same member weighed the onions off a patch 6yds. by 5yds., and got 4½cwt, though one could hardly see the onions because of the weeds.

EXPERIMENTAL WORK.—A long discussion took place on the experimental plots. Members thought the good land should be tested as well as the bad.

Longwood, February 11.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes (chair), Vogel, Roebuck, Oinn, Pritchard, Furniss, J. and W. Nicholls, Glyde, Coles (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. Roebuck. The visitors found on inspection that the garden was splendidly situated in the water line of a creek which emptied itself into the Onkaparinga, and every advantage had been taken of the natural adaptation for irrigation. Waterways had been cut and the land graded to utilise every square yard, and the result of over 16 years' of toil and study, seen from the orchard and cottage on the hillside, presented a beautiful view. Mr. Roebuck studied market requirements, and was now marketing butter beans, potatoes, onions, marrows, pumpkins, turnips, swedes, rhubarb, &c. A semi-spring and winter variety of rhubarb was pointed out, 50 roots of which planted last September had yielded 14 dozen pounds of rhubarb by the end of January. It needed well-drained land and plenty of manure and water. Onions in this locality were affected with thrip. Continual war had to be waged against weeds. Bamboo water reed was particularly troublesome. On the rising ground apples, pears, plums, &c., were grown, and here was seen another instance of ironstone reefs or ridges failing to support plum trees.

EXHIBITS.—The following exhibits were tabled:—Wickson Jap plum, good bearer, large, and showy; also Black Diamond plum. Japanese millet, 3ft. 6in. high, 10 weeks from seed, just coming into flower. After being cut one week it had grown 6in. Swamp potatoes. These were the second crop from seed originally obtained from Dr. Holtze. Mr. Oinn reported that 89 per cent. were marketable. They were grown on land previously occupied by blight-affected potatoes. The potato was even shaped, the skin deep pink, flesh firm and white, and flavor good. Planted October 26th, 1910; dug at end of January, 1911. Grown almost in mud. Members agreed that seed used from potatoes planted in December yielded better than from earlier grown seed.

EXPERIMENTS IN MANURING.—A paper under this title was read by Mr. Pritchard, who said that the only practical way to find out what manures were required for a given soil was to experiment. Soil analysis was not a method by which the requirements could be finally decided. So far as he could see, practically no commercial fertilisers were used in this district besides bonedust. It was applied to fruit trees, strawberries, cabbages, potatoes, and so on, and he thought it was time that the suitability of other fertilisers was tested. There were difficulties peculiar to the district which could be overcome by experimental work. For instance, the prevalence of club root, which was a characteristic disease in cabbages grown in soil deficient in lime. The very fact that bonedust was an effective manure pointed to the probability of its 10 per cent. of lime being an important factor, and seeing that lime neutralised injurious acids in the soil, he considered experiments should be carefully conducted to ascertain what improvement could be effected by the application of various quantities of lime per acre. A member of this Branch had used bonedust on his land for some years with fair results, and then applied dressings of lime only for three years with still better yields than before. The phosphorus in water-soluble phosphate was not leached out of the soil if once fixed by combination with lime. Phosphate of lime preserved the phosphoric acid in the form which the plants could take up, but as phosphate of iron it was not available to them, so that where lime was deficient in the local soils a larger portion of the phosphoric acid in the manures combined with iron, and, so far as the plants were concerned, was locked up. For these and other reasons he considered it was quite time that experiments should be carried out very carefully as suggested. He further suggested the appointment of a committee of the Bureau to go into this matter of experimenting and outlined the method which, in his opinion, would prove most satisfactory for the conduct of the suggested experiments. Members said that during the last few years progressive gardeners had been convinced that in regard to manuring there was no certainty as to the correctness of local methods. It had been largely experimented in without any system or tabulating of results. Those who used lime were unanimous that it opened up stiff ground, and sweetened cold, wet, and hungry soils. Cattle preferred grass from land which had been treated with lime. Users of bonedust said that beyond opening up stiff soils and checking the acidity, lime had not much to recommend it, seeing that it was too costly for general use. The outcome of the discussion was the formation of a committee to conduct experiments in the way suggested by Mr. Pritchard.

SLUGS AND SUPER.—Mr. Oinn wished to know whether the use of super. would rid the soil of slugs. [While a topdressing of super. appears to be very effective in destroying slugs, it is not at all probable that it would rid the soil of this pest.—ED.]

Tea was kindly provided by Mrs. Roebuck, who was suitably thanked.

Meadows, February 13.

(Average annual rainfall, 34½ in.)

PRESENT.—Messrs. Ellis (chair), Catt, Morriss, Kleeman, Smith, Nottage, and Bertram (Hon. Sec.).

SHEEP FOR FARMERS.—A paper to the following effect was read by Mr. Nottage :—
 “Merino ewes would be the best to keep for this district, being well able to stand the winter. The weight of wool on these sheep is greater, and commands a higher price than any other breed. By dividing the run into several paddocks and changing frequently the sheep do better than continually going over the same ground. Keep fences in good repair do not overstock, and no trouble should be experienced. The Merino is not noted for creeping through fences as some other breeds are, as, for instance, the Lincoln. Ewes should be culled out as soon as they are full-mouthed. They will not fatten so readily after their mouths begin to go. Ewes should be examined twice a year, after lambing and again in September, to guard against the blowfly. Dipping not only kills tick and other pests, but improves the quality of the wool. For lamb-breeding I would use Shropshire rams, mating them after shearing. April lambs have a good start before the wet sets in. Tail them as soon as they are old enough to stand it. Seaming irons have replaced the old method of tailing with a knife, and are much better. Early lambs may be shorn, and this gives them a much better chance to fatten. They may be turned on to the stubble, and by having one or two sheep as leaders will soon develop a taste for any peas left on the ground. This will clean the ground of weeds, and improve it for cropping another year.” In the discussion which followed the Chairman said some farmers objected to seaming irons for lamb-tailing on the grounds that they caused a scab to form on the end of the tail. Mr. Morriss said that the application of a little kerosine immediately after seaming would prevent the scab from forming. He thought it advisable to breech ewes about six weeks before shearing. This helped to prevent flyblow, and saved a lot of skirting at shearing time.

Meningie, March 11.

(Average annual rainfall, 19 in.)

PRESENT.—Messrs. Scott (chair), Coad, Hiscock, Mincham, Taylor, and Tregilgas (Hon. Sec.).

DAIRYING.—A short paper on “Dairying” was read by Mr. Mincham. The best cows possible should be procured for a start, he said, and then from the choicest of these the heifers for the future herd should be selected. They should have nice sized and shaped teats and udders, and also be of a good sound constitution. Cows that were comparatively thin when in milk were usually more profitable than those that kept their condition. He preferred those that had a strain of Jersey in them rather than purebreds. Pure Jerseys were more easily affected by changes in the weather and were of a nervous temperament. The Shorthorn-Jersey crossbred gave very good results. Cleanliness was absolutely essential to good dairying. Regular milking was conducive to a good flow of milk. He liked to have all cows baled for milking, and found it necessary to be sure that they were stripped dry if children did some of the milking; otherwise the milk supply would diminish. Large quantities of food were necessary for the production of a plentiful supply of milk. Natural grasses were good, and lucerne, barley, and hay gave good results. Yards should be roomy, and if the tips were taken off the cows' horns many a nasty wound would be avoided. Hot water and castor oil were good for inflamed udders, and pumping air into the udders would save the cows if they had milk fever. Cows should always be treated quietly. The greater the care bestowed the greater the profits would be. Mr. Hiscock agreed with the writer in all details. The Hon. Secretary thought the pure Jersey was the ideal dairy cow, and recommended the use of rugs to overcome the effects of cold where the cows were not stall-fed. If a crossbred was desired he preferred the Holstein-Jersey.

Mount Pleasant, March 10.

(Average annual rainfall, 27 in.)

PRESENT.—Messrs. Giles (chair), Royal, P. and J. F. Miller, Phillis, Thompson, Maxwell (Hon. Sec.), and one visitor.

SWINGLETREES.—The Hon. Secretary initiated a discussion on swingletrees, and referred to swings or eveners behind two horses, usually called two-horse swings. One kind had eyebolts or clamps fixed firmly on the ends as well as in the centre, and the

speaker contended that if the horses did not pull evenly the one in front had the heavier load. Another pattern had clamps on each end fixed behind the swing and working free, while the one in the centre fixed in front was also working free. With this kind the horse that kept his end in front had the lighter load. The third and best style had the clamps or eyebolts on the end fixed firmly, whilst the one in the centre was fixed in front of the swing and worked free. The horses were then required to pull about the same load, provided there was not too great a difference between the power of the animals. Mr. J. F. Miller favored the clamps or eyebolts fixed on the ends and also in the centre. The Chairman thought the most important consideration was to have the horses of equal pace.

CONSERVATION OF WATER.—This subject was introduced by Mr. Giles, who thought it paid to sink tanks, build up walls, and cement them. Stock would always drink tank water, and if a suitable piece of ground could be found with a good catchment and a fall below, it was an inexpensive matter to carry the water away in pipes to any part desired. It was an expensive matter to sink wells and bores. He advocated putting down tanks in each paddock of reasonable size. In the discussion which followed Mr. Royal preferred to put down bores instead of tanks. Other members thought the plan outlined by Mr. Giles was the most suitable where the nature of the country permitted it.

STOCK.—It was reported that stock were doing very well indeed.

RAINFALL.—The rainfall for February was given as 2.24in.

Port Elliot, February 18.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. H. B. Welch (chair), H. Welch, Brown, Pannel, Green, and Hargreaves (Hon. Sec.).

SOIL DRAINAGE.—The Chairman read a paper on the question of soil drainage. During the past two seasons, he said, most of the crops in this district had been very poor owing to excess of moisture in the soil. When single-furrow ploughs were used the water drained away between the narrow lands, but with harvesters, binders, &c., to manipulate, so many furrows would be a nuisance. He considered it was unprofitable to cultivate the light local soils without drainage, and unless some satisfactory way of carrying off the water could be adopted, thought it would be advisable to give up the cultivation of cereals and plant wattles or some timber trees which would take up large quantities of water. Possibly open drains planted with suitable grass to prevent washing would be of some use. Members were of opinion that it was not advisable to plough round paddocks in wet districts, as then there were not enough furrows to drain the land. This applied especially to light soils.

RABBITS.—Attention was drawn to the large number of rabbits in the district, and members were of opinion that simultaneous destruction should be enforced.

Uraidla and Summertown, March 6.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. Collins (chair), Rowe, Hawke, Kessell, Mould, G. F. and H. F. Johnson, Hart, Pappin, Prentice, Dyer, and Snell (Hon. Sec.).

SWEDS TURNIPS.—Mr. G. F. Johnson read a paper dealing with the cultivation of swede turnips. He considered it advisable for the grower to grow his own seed from year to year, and for this purpose would select well-shaped young plants with a fine root and transplant them at about the end of August. Sufficient space should be left to hoe between the plants. The seed should be ready to cut by the middle of January. The soil for the turnip crop should be ploughed two or three times during the spring, the last time to a depth of 8in. or 9in. and worked to a fine surface. The paper then continued—“Where the plants can be irrigated the seed can be sown in October or November. At Carey’s Gully we usually sow at about the end of the year under the following conditions:—Land ploughed three times, harrowed and rolled. Draw drills with a Planet cultivator about 18in. apart and 4in. or 5in. deep, cover seed with the harrows and roll; single the plants out to 9in. or 10in. apart. It is better to grow swedes that will go three or four to the bunch than half a dozen small ones. We sowed this season on the 28th of December, and had swedes fit for market just nine weeks from the time of sowing. These were sown at the rate of about 2lbs. of seed to the acre, without irrigation or manure. The

land was in excellent heart, having had potatoes in it for the last four years. Last season was dry, but we sowed on the 27th of December and had swedes for market in 10½ weeks. In the event of there being no market for them we find in the swede a splendid food for pigs and poultry. It is a much heavier cropper than the white or yellow turnip, and will stand longer in the ground and keep better if pulled and stacked. This adds to its value as a fodder plant. If boiled the tops as well as the roots make excellent food for stock. In the event of the early crop losing their tops there is usually a good demand for them by the hundredweight for outgoing boats, 4s. 6d. being paid per hundredweight last season. This price, with a good sample, is better than 1s. 6d. per dozen bunches, because they can be handled much more easily and quickly. For early sowing I think the Elephant is one of the best varieties. It is a long swede and a quick grower. The round swede is a good one for late sowing, carrying a good top late in the winter. If fertilisers are used, I advise bonedust or bone super, 3cwt. to 5cwt. per acre, according to the conditions of the land. A good crop of swedes will return about 5doz. bunches to the rod, which at 1s. 6d. per dozen is a more payable crop than potatoes at present."

SOUTH-EAST DISTRICT.

Frances, March 18.

PRESENT.—Messrs. Atkinson (chair), Watts, Meehan, Tompkins, Feineler (Hon. Sec.), and one visitor.

HARVESTER v. STRIPPER.—A paper under this title was read by Mr. Watts. An up-to-date harvester, he said, with one man and a young lad and with two good teams, could harvest from 150 to 200 acres with very little trouble. Were the stripper and winnower used, three or four men would be needed to do the same work. As it had been almost impossible to get men at harvest time during the past four years, thousands of bushels of wheat would have been lost but for the harvesters. With the harvester operations could be commenced much earlier on a damp morning than with the older machine, and a heavy and tangled crop could be handled to better advantage. Should the weather render harvesting impracticable, bags could be sewn up and marketed. The harvester should have an adjustable comb and a 6in. drop from the throat to the peg drum, so that the wheat would not fly from the latter back to the beaters. There should be plenty of riddle room, and the riddles should also be adjustable at the pleasure of the driver. These were only a few of the points well worth considering. In the discussion which followed members agreed generally with the views expressed, especially in regard to the saving of labor and time, both of which were great considerations. Reference was made to the sample, but it was generally agreed that if screens were well attended to the sample would be as good as from the winnower, and in a "draky" crop better than if taken off by the stripper and winnowed, the harvester proving an extra good drake screener. It was said that harvested grain used for seed was not so good as grain taken off by the stripper and cleaned with a winnower, but members were quite satisfied that the grain from the harvester was not damaged, and was all right for seed. Putting it through the winnower of course made a better sample of it.

Kalangadoo, February 24.

PRESENT.—Messrs. Crouch (chair), S. and D. W. Tucker, J. and R. Boyce, McCall, Davies, Bennett, Guerin, Mitchell, and Sudholz (Hon. Sec.).

WHEATS FOR DISTRICT.—Having entered into considerable discussion respecting the production of wheat for show purposes, members were asked to say which varieties of wheat they considered most suited to the district. It was thought that Comeback, Federation, White Tuscan, Dart's Imperial, and Yandilla King were the best. It was stated that when two trucks of wheat were weighed (one containing 78 bags of Comeback and the other the same number of bags of Federation), the Comeback proved to be the heavier by 6½cwt.

Kybybolite, February 9.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), Hahn, Lloyd, Pettit, Smith, Koth, Lacey, Schulz, Scott (Hon. Sec.), and three visitors.

WHEAT-GROWING.—A paper on "Wheat-growing in this District" was read by Mr. Lloyd. It was a most important matter, he said, to get a good firm seed bed before sowing. Fallow should be ploughed back and well harrowed. In June, 1909, he had ploughed, harrowed close behind the plough, and drilled straight behind the harrow. He reaped only $\frac{1}{2}$ bush. per acre. July ploughing the same year had been harrowed well in September, allowed two days to dry, and then the seed drilled in. The result was 10 bush. per acre, showing that the firmer seed bed obtained by leaving the soil awhile after ploughing made all the difference in the result. In April and May, 1910, he sowed again, and the earlier-sown crop only yielded 3 bush. per acre. The May sowing was in a better seed bed, and the result was 6 bush. In both cases takeall pulled down the average. June sowing had been successful with him, in land well worked down with the harrows, the yield being 15 bush. average. From these results and others he had come to the conclusion that it would pay a local farmer better to sow some of his seed rather late in well-worked soil than to sow early in unfit weather and in poorly-worked land. In the discussion which followed Mr. Lloyd said he ploughed about 3 in. deep on an average. Mr. G. H. Hahn said that fallow had not been a success with him. It grew more sorrel than crop. His best crops were off land ploughed up and sown straight away. He thought rolling would be beneficial, especially on new ground, as it would firm down the plough furrows. The Hon. Secretary's best crop last harvest had been off stubble land once ploughed. He thought any land here should lie for a while between ploughing and drilling to sweeten it. Mr. Bradley said new land should never be cropped more than two years running, as otherwise the sorrel was very troublesome. If rotation crops would check sorrel they would help.

Lucindale, February 27.(Average annual rainfall, 22 $\frac{1}{2}$ in.)

PRESENT.—Messrs. Rayson (chair), Rivett, Carmichael, Johnston, Dow, Secker, McMorron, Natt, and W. M. Secker (Hon. Sec.).

MANURES FOR POTATOES.—Mr. McMorron reported on experiments conducted by him with various dressings of Hasell's potato manure. The land selected had been previously under kale, and two years before had been treated with stable manure. Whole sets of the Redskin variety were used, each being about half as large again as a hen's egg. The potato manure was placed within each reach of the plant, but not touching the seed. The unmanured plot yielded at the rate of 11 tons lewt. of potatoes per acre. Plot treated with 1 ton lewt. manure per acre yielded at the rate of 9 tons 4cwts., or 1 ton 16cwts. less than the unmanured plot. Plot treated with 10cwts manure per acre yielded 10 tons 13cwts., or 8cwts. less than the unmanured plot. Plot No. 3, treated with 5cwts. manure per acre, returned 13 tons 2cwts. of tubers per acre, or 2 tons lewt. more than the unmanured plot, at a cost of £1 2s. 5d for the manure. On inspecting specimens of the potatoes produced, members found the best samples were from the two plots which gave the greatest yields, viz., unmanured and manured at the rate of 5cwts. per acre. Messrs. Johnston and Rivett quoted instances to show the beneficial effect upon potato crops of a rational dressing of super. and other manures.

Mount Gambier, March 11.(Average annual rainfall, 31 $\frac{1}{2}$ in.)

PRESENT.—Messrs. Sassanowsky (chair), Keegan, Botterill, Smith, Sutton, Kennedy, Wheeler, Buck, Ruwoldt, Wedd, Kilsby, Major, and Collins (Hon. Sec.).

PAINTING WOOD, IRON, AND STONE.—An interesting paper on "Painting" was read by Mr. Wheeler. Having spoken of the wisdom of preserving all sorts of buildings, etc., by painting them, and emphasized the necessity of procuring only reliable brands of white lead, oil, stainers, turps, &c., the paper continued much as follows:—"Care must be taken not to mix too great a quantity, as if it is exposed to the air too long before being used, when exposed to the sun's rays it will soon blister off. All knots or resinous veins bleeding should be well scraped, and then receive a coat of patent knotting, which will dry very quickly and hard. This will prevent the resin from coming through, and allow the paint to remain. It is far better to put two thin coats on at an interval of

a week than one thick one, as it will penetrate much better and preserve the wood. Paint ready for use should be about the consistency of thin cream, and must be brushed out evenly. It is most important that the surface to be painted should be thoroughly clean and dry. In staining the paint, many useful shades are obtained by using burnt Turkey umber, Oxford or yellow ochre, and burnt sienna. Ready mixed paints, of which there are many different kinds, can be procured in almost every shade, and for the amateur I would recommend them unless he is well up in the art of coloring. Poor paint is no protection from the wind and rain." Mr. Wheeler added that ordinary paint was no good for ironwork. Paint that had a good deal of turpentine in it was considered the best, and was what he used for the purpose. New Zealand hematite was said to be a good paint for iron, and there were a good many colors in it. If too much oil was used for ironwork, it would scale off. To leave a gloss on the paint it must be varnished. For painting a tin shed Mr. Wheeler said Sherwin & Williams's paints would do. Ordinary stone colors were good for out-of-door work, and in painting stone. The local stone was very porous, and damp easily penetrated it, even through the ties. They could coat the outside of the wall with a mixture of thick whiting and water, a coating of raw oil over that, and then a coating of paint. That made a glazed surface which no water or damp would penetrate, provided there was a damp course below. Painting roofs red with oxide of iron had the effect of making the houses cool, and it prevented the iron from rusting. It was therefore specially advantageous at the seaside. White lead and oil was best to paint a picket fence. It could be colored with umber, &c., and should last three or four years. Patent driers were used by many, but they injured the paint. Some water paints were very good.

Tatiara, February 18.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. Saxon (chair), Milne, Prescott, Staude, Stanton, O'Shea, Wilson, Reschke, Truman (Hon. Sec.), and one visitor.

EXAMINATION OF STALLIONS.—Mr. Reschke read a paper as follows:—"I fully approve of the examination of stallions, but my opinion is that a stallion should be examined internally as well as externally. First of all is his heart good? Has he good nerves, cool temper, and good constitution? Usually they are only examined about the legs and feet, and if not found sound they are rejected. My opinion is that most horses which are unsound in the legs and feet are so because of overfeeding when foals. Owners feed them with too much corn to make them big and bulky, and put too much weight on their legs. Perhaps they do not give them room enough for exercise. While such a horse is young—up to about three years old—there is nothing showing on his legs, but after that the trouble begins in his legs and feet, and he cannot stand the travelling. I notice that stallions which gain certificates are only young horses which have never travelled, and after they have travelled there are very few which will pass and gain certificates. My opinion is that it cannot be disease in all cases. I also think a stallion should be limited to a certain number of mares. At three years old they should take no more than 20 mares, and up to eight years of age they should take no more than 50, and after 10 years they should not be allowed to travel, as they cannot do justice." The Chairman agreed that young stock were damaged by allowing them to serve too many mares. Mr. Wilson thought the number of mares served should be recorded and shown to owners. Mr. O'Shea knew of many stallions over 10 years of age showing splendid results. Mr. Milne agreed with the paper on the whole, more especially in regard to limiting the number of mares served.

CARE OF WHEELS.—In reply to certain questions asked by a correspondent concerning his paper on this subject (see page 722, February issue), the Hon. Secretary supplied the following additional information:—"The oil should be quite hot, but not boiling. Raw linseed oil should be used, as if boiled it would not penetrate so well. Care should be exercised to prevent the oil from splashing over on to the fire, or a big blaze might result. The remarks applied to hickory wheels all out, or felloe wheels, not sarven or rubber-tired wheels. The oiling process was not to tighten up a very loose wheel, but to prevent a good tight wheel from becoming loose, and to avoid the continual tire-cutting which dished and ruined the wheels."

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Resignation of Major Norton.

Recently the Hon. J. P. Wilson, M.L.C., received a cablegram from the Trade Commissioner in Great Britain (Major Norton), tendering his resignation, to date from July 31st. Major Norton was appointed Commercial Agent for South Australia about five years ago, the title being changed to that of Trade Commissioner in July, 1909. During his term of office he has been indefatigable in advertising South Australian produce and in opening up new markets. His success in finding outlets for our honey has been a noteworthy achievement in view of failures of the past with this line of produce. Major Norton has accepted a position as director in Messrs. R. W. Davidson & Co., Limited, of Glasgow, and producers in this State, while regretting his resignation, will wish him every success in his new sphere of work.

An Interesting Shipment of Fruit.

The members of the Somerville Fruitgrowers' Association (Victoria) are undertaking an experiment in the export of fruit to England which will be watched with considerable interest by those engaged in the fruit industry. By the s.s. *Suvic*, which sailed on April 21st, about 200 cases of late keeping apples were shipped as ordinary cargo between decks. In view of the fact that varieties such as Rome Beauty, Nickajack, Beauty of Australia, Rokewood, and others keep well for four or five months in ordinary storage, it should be possible to ship limited quantities as ordinary cargo at low freights, provided they can be stored where there is a fair amount of ventilation.

Dairy Cattle for Java.

The Government of Netherlands-India have been buying in South Australia a number of Jersey and milking Shorthorn cattle for use in Java. The first shipment left Port Adelaide recently for Sourabaya. It is understood that preference has been given to this State owing to our freedom from pleuropneumonia for many years—a result which is due to the care taken by the Stock Department in inoculating animals.

The Meat Trust.

The position in regard to Americans and the Australasian meat trade is quite serious enough to call for action of some kind or other. In an insidious manner Americans are working in the direction of obtaining control of the Australasian meat supplies, with a view to ultimately controlling the market at the other end. We have it on good authority that Americans are operating *sub rosa*, but very strongly, in New Zealand, and a considerable proportion of the meat exported from the Dominion is owned by the Meat Trust. There are signs of these operations extending in New Zealand during the coming season, and as no names appear there is nothing to prevent the operators getting all the meat they want, provided they pay the price. As far as can be ascertained their transactions are conducted by various agents either as buyers of live stock or purchasers on a c.i.f. basis.—*Pastoralists' Review* for April.

Winter School for Farmers.

The Hawkesbury Agricultural College, New South Wales, has made a new departure by instituting short courses for busy farmers and stockowners in the slack period of the year. In this way they are afforded an opportunity of acquiring the greatest amount of directly useful information in the shortest time. Farmers and graziers, or their sons who have worked at least one year on the land and are over 16 years of age, are eligible for admission, the number being limited to 100. This winter school course embraces a variety of subjects and is continued for four weeks, from June 19th of this year to July 15th, the fee being £2 2s., including board and lodging at the college; but each student has to provide himself with towels, sheets, pillow-cases, soap, and blacking brushes. The idea of the course is doubtless borrowed from the United States of America, where it has long been the custom for the progressive farmer's son to take a course of a month or two at the State Agricultural College while the snow is on the ground and farm work is at a minimum.

Large v. Small Farms.

Over 50 years ago Abraham Lincoln said—"The ambition for broad acres leads to poor farming, even with men of energy. I scarcely ever knew a mammoth farm to sustain itself, much less to return a profit upon the outlay. I have more than once known a man to spend a respectable fortune upon one, fail, and leave it, and then some man of modest aim get a small fraction of the ground and make a good living upon it. Mammoth farms are like tools or weapons which are too heavy to be handled—ere long they are thrown aside at a great loss."

Lands Open for Selection.

The new lands in the hundreds of Hooper and Marmon Jabuk, comprising 186,000 acres and lying north-easterly from Tailem Bend and along the route of the railway from Tailem Bend to Brown's Well, will be gazetted for application about the middle of May. The North Booborowie Estate, containing over 33,000 acres of repurchased land in the Lower North, will be open for application in two or three weeks' time. There will also be offered at an early date 171,000 acres in the new hundreds of Vincent and Wilson, along the Tailem Bend and Brown's Well line; 30,000 acres in the hundred of Moody, north-west of Tumby Bay; and 93,000 acres in the hundreds of Rudall and Yadnarie, west of Franklin Harbor and north-west of Arno Bay.

The International Agricultural Congress.

The International Agricultural Congress has held its sittings in Madrid from May 1st to 6th of this year. The Congress is held every four years, the previous session having met at Vienna in 1907. The subjects to be discussed at Madrid included the organisation of co-operation and agricultural credit, reafforestation, diseases of fruit trees, animal nutrition, and the application of new manures.

A Simple Mouse Trap.

The need of a convenient mouse trap is at times apparent, when it is not easy to obtain the article. A young housekeeper in one of our cities, however, has accidentally discovered a substitute for a trap. It is nothing else but the ordinary sticky fly paper, which she places convenient to their haunt, and has not only made several captures, but has evidently frightened away the survivors, who do not seem to understand that sort of device at all.

Seedless Watermelons.

"The arrival in Chicago of a carload of seedless watermelons marks progress," says an American journal. "By all means let us have more of them. The one great fault of the watermelon has been its excess of seeds, that interferes with the joy of consumption. These watermelons came from New Mexico, and the process of reaching the seedless condition is thus described:—'After the vine has grown for 3ft. or 4ft. in length, the end is covered with earth. When this end takes root it is cut loose from the old root, and the early blooms are pulled. Melons grown from the second blooms are seedless.'"

Imports and Exports of Fruits.

During the month of April 8,820bush. of fresh fruits, 588 bags of potatoes, 42 bags of onions, and 39pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 500bush. of bananas (chiefly over-ripe) were destroyed. The exports to inter-State markets examined and passed at Adelaide and Port Adelaide comprised 14,094bush. of fresh fruits, 3,360pkgs. of vegetables, and 33pkgs. of plants. In addition, 121bush. of fresh fruits were certified for export at Gawler, 125 bags of potatoes and 34 bags of onions and 3bush. of fruits at Coonawarra, 181bush. of fresh fruits at Wirrabara, 1,693bush. at Clare, 38bush. at Laura, and 51bush. at Stirling West. Under the Federal Commerce Act 41,764 cases of fresh fruits, 2,926pkgs. of dried fruit, 63pkgs. of preserved fruit, 8pkgs. of potatoes, and 628pkgs. of honey were exported to oversea markets during the same period. These were distributed as follows :—For London, 4,151 cases of pears, 19,896 cases of apples, 50 cases of grapes, 2 cases of peaches, 2 cases of quinces, 9pkgs. preserved fruit, 2,874pkgs. dried fruit, and 427pkgs. honey; for Germany, 11,106 cases of apples, 773 cases pears, and 201 cases honey; for New Zealand, 2,158 cases grapes, 500 cases lemons, 50 cases dried fruit; for India and East, 2,756 cases apples, 25 cases pears, 345 cases grapes, 54pkgs. preserved fruit, 2pkgs. dried fruit, and 8pkgs. potatoes. Under the Quarantine Act 1,926pkgs. of plants, seeds, bulbs, etc., were admitted from oversea sources.

Injury from Arsenate of Lead.

Professor Woodworth, of California, recently referred to some difficulties experienced by fruitgrowers in the Pajaro Valley, California, in dealing with codlin moth. Investigations conducted over several years showed that not only was Paris green injurious to the trees, but also a number of brands of arsenate of lead. The Pajaro Valley opens out on Monterey Bay, and as a consequence there are almost daily fogs in the evenings throughout the summer. It has been found that the effect of this continual drenching at night is to set free the acid in the spray, causing serious injury to the foliage. None of the commercial brands of arsenate of lead which were giving satisfactory results in other parts could be used with safety in this particular locality on this account. During the following years hundreds of experimental samples of arsenicals were made up and tested, of which quite a number proved satisfactory. On testing these in the laboratory it was found that these samples contained no arsenic acid soluble in ammonia—that is, they consisted of saturated lead salt.

Pig-Breeding Methods Contrasted.

The industry as conducted in Denmark has lessons for the average pig-breeder all along the way. The top place in the bacon trade of England has been the goal in view; and the energies of the Government, the pig-breeder, the pig-feeder, the curer, and the seller all point in the one direction. As one man, all interested in the industry pull together; and every branch separately works for perfection of the whole. The pig-raiser wants only bacon pigs, and these as prolific and good as possible. The feeder, with his eye constantly on the grade his pigs shall ultimately reach, studies to gain this from the least outlay for feed. He does nothing by spells and spasms, but finds the road and persists in following it. Judgment, born of successful experience, keeps his day-to-day practice right, and as a pig-raiser he succeeds. His conditions are not unlike those of the Canadian farmer who follows dairying, except that he has more feed to buy on account of his limited acres. He is succeeding because he will keep only such pigs as are good mothers of vigorous litters; in feeding them only on such foods and in such a manner as he knows gives greatest ultimate profit; in observing the demands of the market upon which the size of his pay cheque depends; and by his confidence in his own efforts and those in charge of the other branches of the industry. The value of milk and whey in pig-feeding was everywhere exemplified. The Canadian Commissioners who visited Europe recently to compare methods, saw very few pigs being fed without one or the other, and nowhere were these foods fed without a care for the greatest profit. Roughage, in the form of roots or other green fodder, is considered an essential part of the successful pig-raiser's food supply. These, it is generally believed, help materially to maintain thrift in breeding and growing stock. Nowhere can these be cheaper grown than in Canada, and no pig-raiser can afford to be without them. Another lesson gathered in each country visited is the importance of carefully grading the ration according to the age of the pigs and the object in view. Everywhere young pigs were fed on easily digested food, rather light in character, and with only a small percentage of green food. As the pigs get older, roughage is increased to cheapen the ration and strengthen and keep in tone the digestive organs. As the finishing approaches, the ration is made stronger, which hastens the fattening and assures a high quality of meat.—*Farmer and Stockbreeder.*

Feeding Ewes with Chaff.

Mr. F. H. Kelly, of Undalya, who has been keeping breeding ewes for some five years past, has found great advantage in feeding each of them with 1lb. to 1½lbs. of chaffed hay every day, from the beginning of March until the time when there is good natural feed in the paddocks. The chaff is given to the ewes in troughs, and has kept them and their lambs in first-class order during a trying part of the year.

Wheat Crop Competitions.

Competitions for the best standing wheat crop, inaugurated by the Corowa Agricultural Society, were held recently under somewhat novel conditions. Instead of relying on the eye alone for ascertaining the probable yield, &c., the wheat from 10 acres out of each 100-acre field, entered for competition, was harvested and weighed, after which a sample bushel was taken from each of the competing plots and submitted to the New South Wales Department of Agriculture to have its milling value tested. Among eight competitors, the first prize was awarded to Mr. G. C. Morphett, of Koomangoonong, Balldale, for an average yield of $36\frac{1}{2}$ bush. per acre, going 64½ lbs. to the bushel; variety of wheat, Federation. The land was virgin, fallowed 5 in. with a set mouldboard plough in spring, harrowed once during summer after the January rains, and disked once in March. The prize-winner is a son of Mr. J. C. Morphett, Clerk of the South Australian House of Assembly. Although Corowa has an average rainfall of only 12 in., these eight 10-acre fields gave returns varying from 26 bush. to 37 bush. per acre.

Lucerne Leaf Weevil.

In Utah, U.S.A., a comparatively new enemy of lucerne (*Phytonomus murinus*, or leaf weevil) is doing a large amount of harm and is spreading very rapidly. In 1908 this insect was limited to an area of about 100 square miles; two years later the area of infestation had extended over a belt of country approximately 80 miles long by 75 miles wide. Besides lucerne several other varieties of Medicago, Melilotus, and Trifolium are attacked. The insects in the spring make punctures in the young shoots, chewing the stems and often cause serious injury, the stems wilting and breaking off. In the summer and autumn the epidermis is rasped off the stalks and the leaves slit into ribbons. The eggs of the insects are laid both on and in the stems. The pest spreads by means of its flying habits, and by road and rail transport in fruit and other packages.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

RED OIL FOR AMERICAN BLIGHT.

"A. W. P.," Clare, writes asking for information respecting the use of red oil against the American woolly blight on apple trees.

The Horticultural Instructor (Mr. G. Quinn) replies—"Red oil is used against American blight on apple trees in the form of an emulsion made with soap and water. The only safe time to use it on the trees is in the winter season, when the trees are perfectly dormant. The quantities that have been used in Tasmania and elsewhere with very good results are as follows:—Red oil, 4galls. ; soft soap, 4lbs. ; water to make 60galls. of spray. The method of manufacture is to boil the soap in several gallons of water until it is all dissolved ; then add the oil while the water is at boiling point ; transfer the mixture with force from one bucket to another by means of a strong syringe or force pump until it thickens into a cream-like substance, which, on standing, does not permit the oil to separate and come to the top."

ROUP IN TURKEYS.

"J. K." writes that his turkeys have swellings under the eyes, with discharge from the nostril.

The Poultry Expert (Mr. D. F. Laurie) writes—"This is a form of roup, caused by a bacterium which could only be identified by microscopic examination. Bathing with a 2 per cent. solution of potash permanganate and injecting the same into the nostril cavities with a small glass syringe may effect a cure. Kerosine and oil may also be injected. The swellings should be cut open. Use a sharp, clean knife, dipped in boiling water, and in the permanganate solution to sterilise. Place the finger inside the bird's mouth and press at the rear of the swelling, when the contents are easily evacuated. Then irrigate freely with the permanganate solution. Examine from time to time. The hands should be washed in strong disinfectant after the operation."

SULPHATE OF POTASH AS FERTILISER.

"H. J.," Gladstone, asks whether an application of 14lbs. of sulphate of potash per acre in addition to 42lbs. superphosphate is likely to increase the wheat yield to the extent of 6bush. or 8bush. per acre?

The Director of Agriculture (Mr. W. Lowrie, M.A., B.Sc.) replies—"I do not think that the quantity of 14lbs. of sulphate of potash would be profitable applied to the acre, and I would suggest that you work out the information for yourself on, say, a block of five or ten acres in extent. You may apply, if you think, a light dressing of 14lbs. of sulphate of potash in addition to superphosphate, but I would suggest that it should be somewhat heavier, in order that the effect may be seen (if any). It seems to me that 40lbs. of sulphate of potash would be a minimum likely to show its influence, and would recommend you, therefore, to add 30lbs. to 40lbs. per acre of it to your ordinary dressing of super. on a block of five or ten acres in extent. The latter area would be more convenient for harvesting it as a whole. Have a similar block alongside dressed with phosphates only. If your soil needs potash, it will be evidenced in the yield; if you have no additional yield from the dressing, that will be evidence that your soil has potash in sufficiency. Of course, if your land is weak in the nitrates, neither the super. nor the potash may have much effect. I do not think this is likely, however, if the land is well fallowed, and I would recommend you to try the sulphate of potash on an area as indicated, and harvest the blocks separately. I consider it well worth your while to do so. I have a notion, however, that except on light land sulphate of potash will not be found to be remunerative. I do not think that the mixture of potash and super. should be sown with the seed, and I would recommend you to drill the areas selected with the mixture of super. and potash a short time before seeding; then at seeding time drill in the wheat. Of course, you could broadcast the manure mixture as well as the superphosphate, and this would be better than drilling in the manure by itself, as it would be better distributed."

MIXING NITRATE OF SODA AND SUPERPHOSPHATE.

"Barossa" asked whether there would be any loss occasioned by mixing super. and nitrate of soda?

The Director of Agriculture (Mr. W. Lowrie, M.A., B.Sc.) replies—"You may mix superphosphate and nitrate of soda without loss if you sow promptly after mixing, but the mixture should not be left in a heap or in bags for more than a few hours before sowing. The mixture runs less freely through the drill than good superphosphate straight, and to get freer running of the mixture I suggest adding a little wood ashes. The proportion of wood ashes to superphosphate may be as one to two, or one to three for land such as you describe. You will find mixing wood ashes with your super. advantageous provided you do the mixing within a few hours of sowing."

If you allow the mixture to lie for any length of time, there will be some reversion of the superphosphate. I would suggest that you try on a small block of your land a light dressing of ground quicklime, say 7cwts. to the acre, applied about a fortnight before seeding."

MANURING OF VINEYARDS.

"G. C.," Renmark, writes—"What would you advise to 'bring up' a sandy soil in which young vines are planted, so as to produce good results? The soil seems to be poor and exhausted, and the crops are very poor."

The Principal of the Roseworthy Agricultural College (Professor A. J. Perkins) replies—"It is not easy to give a definite reply without further information on the subject. If available probably the best treatment would be the application of a dressing of about 20 tons of farmyard manure to the acre before the first ploughing. Artificial manures, of course, might also be tried and applied, say, in early August. As to quantities, it is impossible to lay down rules without the experience of the district. Usual dressings are—for super., 3cwts. to 4cwts.; nitrate of soda or sulphate of ammonia, about $\frac{1}{2}$ cwt.; muriate of potash or sulphate of potash, about $\frac{1}{2}$ cwt."

GRAFTING OF SCORCHED VINES.

"E. J. C.," Moonta, writes—"I have some vines growing near a kitchen which took fire some time ago. Since then, although there has been a prolific growth of leaves, no grapes have appeared, no doubt on account of the vines being scorched. Could you inform me whether it would be possible by grafting to get those vines to bear again; and, if so, the best time and method for doing same?"

The Principal of the Roseworthy Agricultural College (Professor Perkins) replies—"I fail to see how the scorching of vines by fire should have the effect of reducing them to barrenness without, however, affecting their growth. It is quite possible, of course, that the year's crop may have been destroyed, but there is no possible reason why succeeding crops should have been affected. There must, therefore, be some other reason to account for the barrenness of the vines. If desired, it is quite possible to graft them by cutting them down in August or September about an inch below the surface of the soil, splitting the stock across its greatest diameter, and inserting two wedges as scions with two buds each."

STOMACH WORMS IN HORSES.

"Belalie North" asks for a remedy for stomach worms in horses.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Feed horses on bran mash at night, and then first thing next morning administer the following drench:—Turpentine, three tablespoonfuls; raw linseed oil, 1 pint."

PICKLING SOLUTIONS.

"W. C. T.," Middleton, writes—"What is the best proportion for pickling seed wheat when using bluestone and salt?"

Answer—The bluestone and salt solution has been tested by the New South Wales Department of Agriculture, but results have been variable, and up to the present very little work has been done with this preparation. The procedure adopted is to dissolve as much common salt as the water will take up (a saturated solution), adding 2lbs. bluestone to 10galls.

RUPTURE IN FOAL.

"Clarendon" asks for remedy for rupture in the navel of a foal.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Rupture in the navel, or umbilical hernia, is generally congenital. Sometimes the rupture disappears without treatment. The application of a pad and bandage is very effectual, but the bandage must be properly adjusted so as to keep the pad in its place. The pad should be the exact size of the swelling, and the attached bandage should consist of elastic and leather with a number of holes, so as to allow tightening. Straps can be fixed to the main bandage to the collar on the neck, and a crupper and belly strap behind will also assist in keeping the pad in position. Surgical treatment should only be undertaken by a qualified veterinary surgeon."

SORE SHOULDERS.

"Shannon" asks for a remedy for sore shoulders in horses.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"As soon as horses have finished work, bathe the shoulders with cold water, and then apply the following lotion:—sulphate of zinc, 1oz.; sugar of lead, 1oz.; water, 1qt. Mix. If the collars are properly adjusted and attended to horses should not suffer from sore shoulders."

INFLUENZA IN HORSES.

"Belalie North" asks for a remedy for influenza in horses.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Influenza. The affected animals should be immediately isolated, and placed in a comfortable, well-ventilated loosebox. The throat should be rubbed twice daily with an ammoniacal liniment, and the head may be steamed with hot bran in which a little oil of eucalyptus has been mixed. Horses should receive three times daily a dessertspoonful each of hyposulphite of soda and saltpetre in the drinking water. Food should consist of green

feed and bran mashes. If symptoms of pneumonia appear, the sides should be blistered with mustard, and stimulants, *e.g.*, whisky, æther, or gin, in 2oz. doses, should be given four times daily in a pint of water. On no account should horses exhibiting symptoms of influenza be worked. Cleansing and disinfection of stables and yards should be attended to."

REPAIRING LEAKS IN CEMENT TANK.

"Barossa" asks is there any easy method of stopping leaks in a cement tank?

The Hydraulic Engineer kindly supplies the following reply:—"It is a very difficult matter sometimes to repair leaks in cement tanks, especially if the foundations are poor. I have stopped them by pumping liquid cement in, under pressure, and when set removing the boards, and also by scabbling the inside work well and then rendering $\frac{1}{2}$ in. to $\frac{3}{4}$ in. in thickness with a mixture of one part cement to two of sand."

MANURE FOR GROWING LUCERNE.

"Davenport" writes—"Could you let me know what quantity of super. per acre would be required for manuring growing lucerne crop, which was planted 12 months ago. Stable manure here contains a lot of couch grass seeds which germinate and choke the lucerne. The soil is sandy."

The Director of Agriculture (Mr. W. Lowrie, M.A.) replies—"I recommend 2cwts. super. per acre."



A HARVEST FIELD.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the above Board was held on Wednesday, April 12th, there being present Messrs. J. W. Sandford (Chairman), C. J. Valentine, Col. Rowell, A. M. Dawkins, G. R. Laffer, J. Miller, and C. Willcox.

At the February meeting of the Board it was resolved, at the suggestion of the Angaston Branch, that the Government should be asked to take steps to reserve in new hundreds suitable areas for timber conservation. The Minister of Agriculture forwarded correspondence showing that the Commissioner of Crown Lands had approved of plans of land about to be surveyed in new hundreds being forwarded to the Conservator of Forests to report whether it was desirable that any particular areas should be reserved for forest purposes. Members expressed appreciation of the action of the Commissioner in giving effect to the Board's suggestion.

Resolution from Uraidla and Summertown Branch asking the Board to support the proposal for a standard fruit case. The Secretary mentioned that at the recent Conference of Ministers of Agriculture a resolution in favor of the standard case of one imperial bushel was adopted. Mr. Laffer said the proposal was supported by the Fruitgrowers' Association. The kerosine case was too large and unfair to growers. He believed that it would be to the best interests of the growers to have the standard bushel case for local use as well as for export. Many who opposed the proposal in the past were now supporters of the Act. Col. Rowell did not favor the standard bushel case for local use. It was true that the present case held a good deal more than a bushel, but it could be obtained much cheaper than bushel cases. He did not think growers would benefit at all by the proposal. It was decided to ask the committee of the Fruitgrowers and Market Gardeners' Association for a report.

Resolutions from Conference of Northern Branches in reference to the Veterinary Department were considered. Members supported the suggestion that the Stock and Veterinary Department should be placed under the control of the Minister of Agriculture, but did not see their way to recommend the appointment of Government veterinary surgeons throughout the State.

A request from Davenport Branch for the establishment of an experimental plot in that district was referred to the Minister of Agriculture.

It was decided to refer to the Editor of the *Journal of Agriculture* the suggestion of Cherry Gardens Branch for the publication of articles dealing with insect, bird, and animal life.

Clarendon Branch wrote calling attention to the spread of St. John's wort (*Hypericum perforatum*), and asked the Board to endeavor to have it proclaimed a noxious weed. The Secretary said that this plant was undoubtedly spreading. Ten years ago it was practically unknown outside Coromandel Valley, but during the past 12 months he had received specimens from Port Lincoln, Klemzig, and other places. The weed was most objectionable and very difficult to eradicate once it obtained a hold. Mr. Laffer stated that only recently he had noticed patches of the weed in the National Park. It was resolved that the Minister of Agriculture be asked to take steps to have St. John's wort declared a noxious weed.

The following gentlemen were approved as members of Branches:—Messrs. W. McCabe, Mallala; E. C. Sullen, Miltalie; J. Maitland, C. Fulwood, and F. G. Langsford, Mount Pleasant; W. H. Giles, Cherry Gardens; E. A. Becker, Colton; H. G. Hornhardt and A. D. Bibney, Utera Plains; D. Smith, Wirrabara; S. G. Shepherd, W. Eime, C. Lehmann, G. L. McEwin, and H. W. Brown, Blyth; L. S. Davie, Shannon; W. Jericho and W. McDonald, Koppio; H. H. Schulz, Forest Range; P. Kirkland and H. W. Harford, Balaklava; J. Bowering, Millicent; J. J. Odgers, Waikerie; Dr. Cowan, Angaston; P. Anderson and E. S. Alcock, Kybybolite; A. J. R. Gurner, Coonalpyn; D. McCorquindale, jun., Kalangadoo; F. Cooper, Frances; F. Siebert, Yorketown; F. W. Laubsch and P. Chigwidden, Yongala Vale; T. H. Dunsford, Narridy.

At the request of Mr. Valentine the Secretary was instructed to obtain from the New South Wales Department information concerning the alleged successful use of ordinary washing soda applied to the soil as a cure for scale on citrus trees and also certain fungus diseases.

Mr. Dawkins said that he thought the publication by the Agricultural Department of a bulletin dealing with the symptoms and treatment of the common ailments of stock was worthy of consideration. In view of the large sum of money represented by stock on an average farm it was important that the owners should know something about treatment of diseases. What they wanted was a clear and concise statement in respect to various diseases, and not of too technical a character. Col. Rowell mentioned that the Military authorities had issued to the officers of the mounted troops instructions as to the care and treatment of their horses. This had been prepared by the Veterinary Surgeon in New South Wales, and was very useful. It was resolved to ask the Minister of Agriculture to bring the suggestion under the notice of his officers.

On the motion of Mr. Laffer, it was resolved to ask the Minister of Agriculture to take action to delay confirmation of proposed city by-laws prohibiting fruit hawkers selling fruit in the streets until growers had an opportunity of placing their views before the Government.

POULTRY-KEEPING.

OPERATIONS FOR MAY.

BY THE POULTRY EXPERT (MR. D. F. LAURIE).

Stock Birds.—Many people defer selecting stock which they may wish to purchase until so late in the season that all the best specimens have been sold. It is of no use waiting until spring; obtain the bird you require as soon as possible. Select the best specimens you can, and see that they are well grown and free from serious defects. For breeding purposes select only mature hens two or even three years old. Do not breed from pullets unless they were hatched very early last season. As size of eggs is an important matter some care should be exercised in selecting the females as well as the male bird. Hens which lay small eggs will transmit that character to their pullets—to the majority if not to all. Male birds bred from hens which lay small eggs will also transmit the character. In the majority of cases the fathers transmit their characteristics through the daughters and the mothers through their sons. Be sure your stock are in good health when purchased, and beware of conveying ticks and lice to a clean yard.

Feeding.—Breeders should feed carefully so that undue condition may be guarded against. If the hens are becoming too fat use more bran in the mash and reduce the wheat and give ample green food. Green food in variety should be planted wherever space can be found. Kails and rape will give a large supply. Where water is not obtainable for irrigation in summer much can be done to aid healthy growth by frequent cultivation and judicious manuring.

What to Avoid.—Many diseases are due to filth; therefore do not throw soft food on the ground, even if it appears "clean." Use troughs and pans, and keep them scrupulously clean and occasionally disinfect them. Careless people enable the doctor and the "other man" to make a living. Keep a supply of fresh clean water always well-shaded. Properly clean and disinfect the water vessels, and avoid the slimy matter in neglected pans, as this is a breeding ground for disease organisms. Avoid the use of cheap, inferior food, such as damaged bran, pollard, and grain, so-called "fowls' wheat," smutty wheat, &c. Much disease is caused by the fungoid growths on damaged foods—these growths cause disease in stock. Do not buy culls and wasters

because they are cheap—their place is in the cooking pot. Many people have a great desire to purchase something valuable at little cost. If you wish to buy good stock you must pay the market price. If you do not desire to buy and breed good stock do not attempt to keep poultry. You will not succeed, and you will make others think the industry unprofitable. Do not erect insanitary and disreputable structures under the impression that they are effective poultry-houses. Have just pride in the quality and utility of your stock and the neatness of your yards and houses and the effectiveness of your methods. Do not neglect your poultry. Give them all the necessary foods, grit, charcoal, shell-forming material, and green food.

Egg Cases.—Several country breeders have asked for egg cases of less capacity than 25doz. These can be supplied at cost on application. These cases save their cost very quickly by minimising breakages. Time is saved in packing, and so also is the important and sometimes costly freight. These egg cases can be branded with your address on one side and that of the Light Square Branch of the Produce Department on the other side of the reversible lid.

Collapsible Poultry Crates.—I can arrange for a supply of these at cost. If sufficient applications are received the cost per crate will be less. When not in use and when returning empty these crates occupy very little space. I am often surprised at the cumbersome and costly (for freight) and ramshackle crates that are used for poultry. Very frequently the packages cause much suffering to the enclosed fowls. By using modern crates all trouble can be avoided and much expense saved.

Dry Feed for Chickens.—For many years I have advised the use of cracked grain mixtures for chickens. The old method of feeding on hard-boiled eggs and bread crumbs has been responsible for great mortality among chickens. Dry feed is used by nearly all large breeders, and should be fed in cocky chaff or short hay chaff, so that the chickens learn to scratch, and thus gain the necessary exercise for health and good digestion. For large numbers of chickens it will pay to procure a grit mill; otherwise the seedsman and poultry food purveyors in Adelaide will supply a suitable mixture. The following grains and seeds are recommended and will ensure good growth and well-developed chickens:—

5 parts wheat.....	} Cracked and mixed.	2 parts millet	}
5 “ hulled oats ...		1 “ canary seed	
2 “ skinless barley		5 “ shell grit	
3 “ maize.....		hard grit	
1 “ peas		sifted bone	

Bran and Pollard.—The usual proportions in which these mill by-products are used in making mash or soft food are two parts pollard to one part of bran. The flour content of pollard varies so much that in some cases the

pollard is composed mainly of fine bran and a trace of flour; in others the flour content is very high. The bran sometimes contains very little pollard. These variations are due to the requirements of the milling trade. While the theoretical proportions of standard pollard and standard bran are two parts to one part, it is often necessary to use nearly three parts of pollard to give the mash the proper feeding value. The food value of any sample of grain or mill by-product depends on many circumstances, such as analysis, fibre content, and condition.

Breeding.—As many of our poultry-breeders are operating on scientific lines, it is desirable to accentuate the necessity for eliminating undesirable characteristics from a flock. Space does not permit of explanation as to the methods to be adopted in specific cases. I shall be pleased to advise breeders who will state a definite case, and for a general treatise would refer them to my pamphlet on "Scientific Breeding"; also to the address I gave at the Poultry Conference last year. Only a very few copies are now available. In my report of the laying competitions special attention was directed to the prevalence of broodiness among Leghorns. I again emphasize the fact also that the statement of a writer to the effect that the matter is inexplicable is due to ignorance of modern knowledge of the laws of breeding. Unless proper methods are adopted the practice of line-breeding will lead to accentuation of undesirable as well as desirable characteristics.

Duck-breeding.—There is practically unlimited scope for the production of prime white-plumaged ducklings for both local and export trades. It is pleasing to report that several persons are about to embark on this branch of the poultry industry. Let the breed selected be either Pekin or Aylesbury of good size and, if possible, with the ducks in their second year. Varieties with colored plumage are of no value for export, and the local poulterers dislike them. Indian Runners are favored by some because they are prolific layers. There is no market for duck eggs in bulk, and as a table bird the Runner is of no value. Among the fanciers the Runner duck is a favorite, and they are much loomed. This is one of the cases where the "fancy" is opposed to utility.

Pure Breeds and Utility.—Pure breeds are universally acknowledged to be the best suited for commercial purposes. There is an unaccountable desire on the part of many to cross various breeds under the impression that a substantial gain will result. Except in some circumstances in the production of table poultry this is an erroneous assumption. Experience has demonstrated the fitness of some and the unfitness of other pure breeds of poultry from a commercial standpoint.

OUR FEATHERED FRIENDS.

PROTECTED NATIVE BIRDS.

HARMONIOUS SHRIKE THRUSH.

SCIENTIFIC NAME: *Colluricincla harmonica*.—*Colluricincla*, from the Greek *Kollyrión*, a shrike, and *Kinklos*, a wagtail; *harmonica*, harmonious.

SIZE.—The thrush is about the size of the grass parrakeet, being between 8in. and 9in. long.

BILL.—The beak is nearly black.

FEET AND LEGS.—Both feet and legs are dark, almost black.

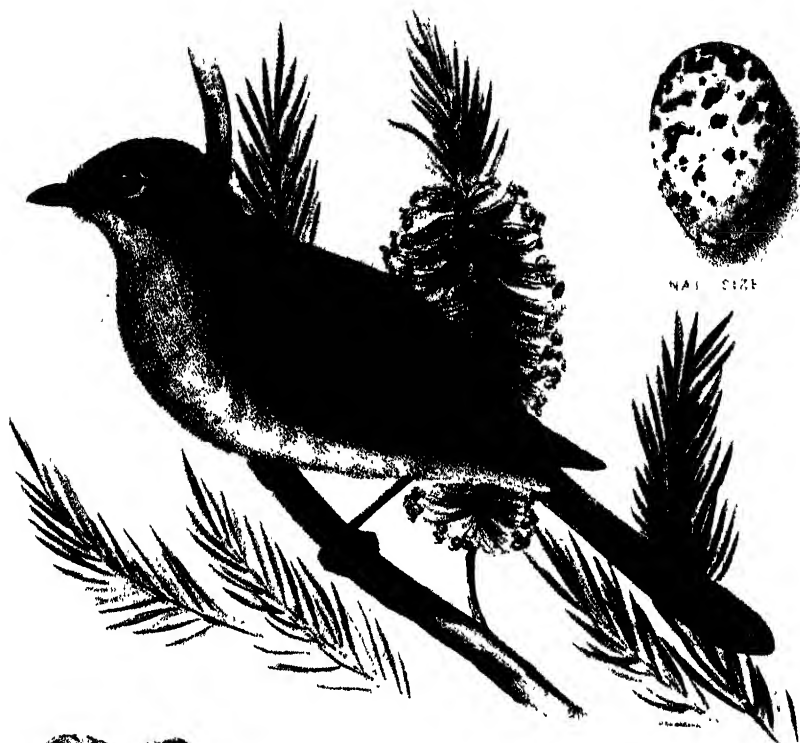
PLUMAGE.—The forehead, crown, and back of the head are brownish grey, owing to a brown streak down the centre of each grey feather. Around each eye is a light ring. The back of the neck and the back are dark brown. The rump is grey, and the tail feathers of a darker grey. The feathers in the wings are dark, with lighter grey edges. The white on the throat merges into grey over the chest, each feather having a faint brown streak down the centre. The abdomen is nearly white.

HABITAT.—This sweet-voiced bird is well distributed over the State, both in the scrub land and open country.

FOOD.—Its food is chiefly insectivorous, and often consists of caterpillars.

NEST.—The nest is cup-shaped, and built of bark and fine twigs. Sometimes it is built in a prong of a bough, but is often placed in the hollow at the end of a broken limb.

EGGS.—The number varies from three to four. They are pearly white to salmon pink in color, and ornamented with faint light-brown spots and blotches of bluish grey. The egg measures about $1\frac{1}{2}$ in. x $\frac{3}{4}$ in.



BLUE DOVE, OR BLACK-FACED GRAUCALUS.

SCIENTIFIC NAME : *Graucalus melanops*.—*Graucalus*, a jackdaw ; *melanops* (Greek), black-faced.

SIZE.—This bird is about the size of a pigeon, being quite 12in. in length when full grown.

BILL.—The bill is leaden grey to black.

FEET AND LEGS.—Both feet and legs are colored leaden-grey to black.

PLUMAGE.—The forehead, sides of the face, and throat are jet black. The black on the throat shades off through grey on the chest to white on the abdomen. The crown and back of the head, the back, and rump are a delicate slaty-grey. The large wing feathers are nearly black, and edged with grey. The tail feathers, with the exception of the two middle ones, are tipped with white.

HABITAT.—These birds prefer open country, where the trees are large.

FOOD.—The graucalus lives chiefly upon large insects, such as mantids, phasmids, and grubs. It is said to be fond of certain native berries and certain species of ants.

NEST.—The nest is a flat, saucer-shaped structure, made from twigs and grass, the ends of which are matted together on the outside with spider web. The presence of the web makes it difficult to discover the flat nest, which is usually paced in a fork on a horizontal limb.

EGGS.—The eggs, which number two or three, are of a dull olive-green color, strongly marked with brown spots, and faint bluish-grey blotches that appear below the surface. The eggs measure about $1\frac{1}{2}$ in. x $\frac{3}{4}$ in.

PALLID CUCKOO, OR UNADORNED CUCKOO.

SCIENTIFIC NAME: *Cuculus inornatus* (Latin), the plain or unadorned cuckoo.

SIZE.—This bird is as large as a dove. Its long tail, however, makes it appear larger.

BILL.—Its bill is pick-shaped and black-pointed, but showing yellow at the sides near the face.

EYES.—The eyes are encircled with yellowish rings.

FEET AND LEGS.—The feet and legs are a dirty yellowish green.

PLUMAGE.—The whole appearance is greyish-brown mottled with white. The under wing and tail feathers are barred with white and tipped with white.

HABITAT.—The cuckoo prefers well-timbered country.

FOOD.—This bird lives chiefly upon insects.

NEST.—The cuckoo does not build a nest for itself; it prefers to lay its egg in the nest of another bird. The cuckoo selects a different nest each time it lays an egg.

EGGS.—Some bird-observers claim that the cuckoo lays quite a large number of eggs in a season. It is, however, a difficult matter to settle. The eggs of the pallid cuckoo are pinkish white, faintly speckled with brown, and measure about $\frac{7}{8}$ in. x $\frac{4}{8}$ in.



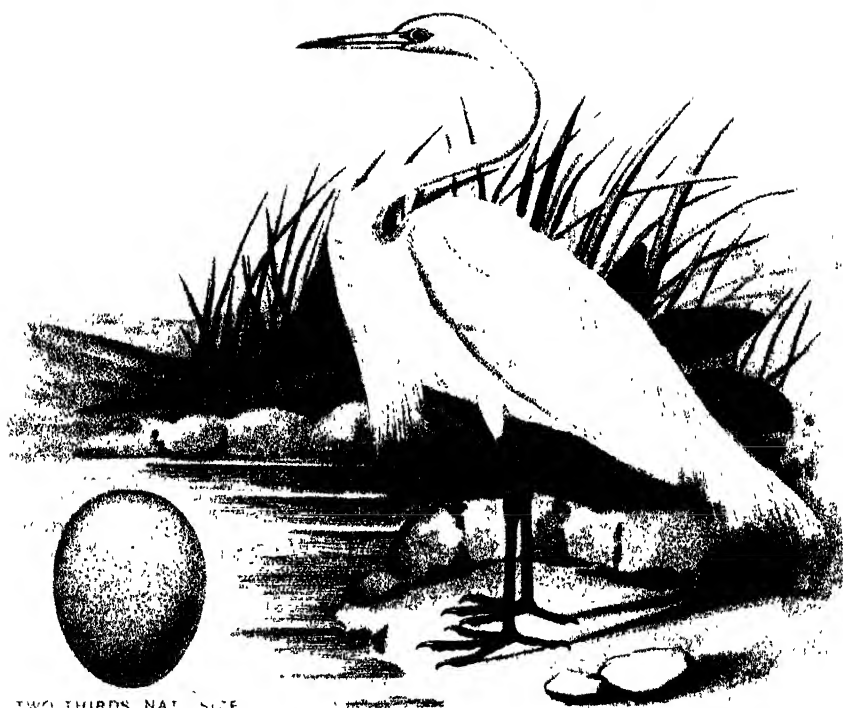
NEST EGG

THE SOUTH AUSTRALIAN GOVERNMENT

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YOUNG STARVING EGRETS.

The price of a hat
(Photo. by A. Mattingley C.M.Z.S.)



TWO THIRDS NAT. SIZE.

LIBRARY OF THE BIRD CLUB OF AUSTRALIA

PLATE 10
The price of a hat
Young Starving Egrets

PLUMED EGRET

SCIENTIFIC NAME *Herodias plumiferus* —*Herodias* from the Greek *erúdios*, a heron, *plumiferus* (Latin), plume-bearing

SIZE.—In size the egret equals the blue crane, or white-fronted heron, being about 2ft. high when standing erect.

BILL.—The bill is a dark-yellow or nearly orange color and the eyes are surrounded with yellow skin.

PLUMAGE—Its plumage is pure white. On the back, near the base of the tail, is a lovely plume of long, slender, pointed feathers; another plume, equally fine, hangs from the lower portion of the neck over the chest.

HABITAT.—The egret lives along the swampy margins of lakes, lagoons, and rivers.

FOOD—Its food consists chiefly of frogs, tadpoles, fish, newts, and aquatic insects.

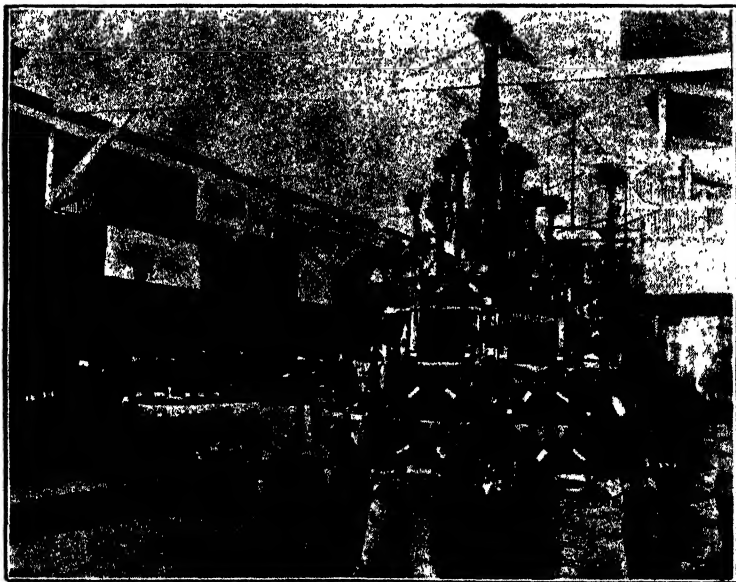
NEST—The egret builds a loose, flat nest of sticks upon a flat forking limb. Nesting operations extend over the months of October, November, and December.

EGGS.—The eggs of the plumed egret are of a uniform pale greenish-blue color. They closely resemble in appearance the eggs of the blue crane, but are a little smaller.

Egret plumes are greatly sought after by bird-hunters, who ruthlessly slay our handsomest and most useful birds to satisfy the fancy of thoughtless people. The word "thoughtless" is used because if many of the ladies who wear the wings, plumes, and skins of birds could but once see the cruel misery and suffering of wounded birds and starving nestlings, they certainly would never wear any but *artificial* feathers and plumes. The upper picture shows the little nestlings rendered fatherless and motherless by the plume-hunters and waiting to be fed by the parents that can never return.

THE AGRICULTURAL DEPARTMENT AT MARCH SHOW.

Portion of Selected Seed Wheat and Poultry Exhibits.



Selected Seed Wheats from Parafield, with Lucerne and other Fodder Plants from Murray Bridge Experimental Farm on the left.

THE AGRICULTURAL DEPARTMENT AT MARCH SHOW.



Portion of Exhibit of Honey, Bottled Fruits, and Tinned Meats from Produce Department.

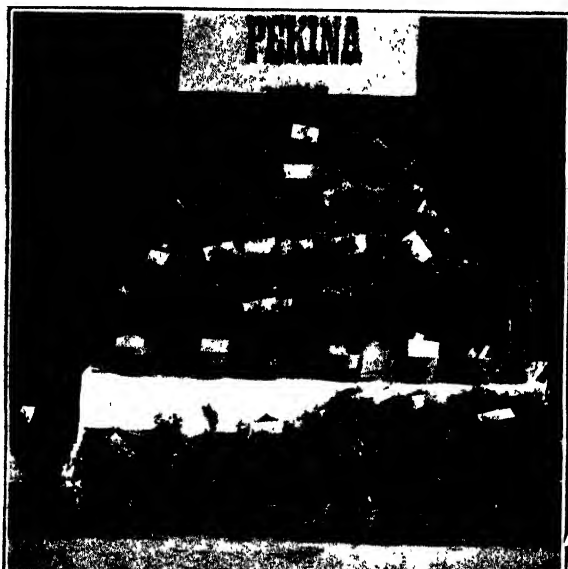


Exhibit of varieties of Lucerne from Pekina Experimental Farm.

AGRICULTURAL BUREAU CONFERENCE.

SOUTH-EASTERN BRANCHES.

The Annual Conference of the South-Eastern Branches of the Agricultural Bureau was held at Naracoorte on Wednesday, March 29th, and was well attended by delegates from all parts of the district. Among those present were the Minister of Agriculture (Hon. J. P. Wilson), the Director of Agriculture (Professor Lowrie), and the following representatives of the various Branches :—Naracoorte—Messrs. E. Coe, L. Wright, S. H. Schinckel, and W. Loller ; Mount Gambier—Messrs. A. A. Sassanowsky, J. C. Ruwoldt, J. H. Buck, A. Dow, and H. G. Wheeler ; Kybybolite—Messrs. A. Bradley, G. H. Hahn, F. Lacey, and D. G. Scott ; Tatiara—Messrs. G. W. Saxon and E. W. Milne ; Lucindale—Messrs. T. W. G. Secker, S. Tavender, E. F. Feuerheerdt, B. A. Feuerheerdt, and W. M. Secker ; Kingston—Messrs. R. Jackson and C. F. Barnett ; Penola—Messrs. H. Richardson, E. F. McBain, and D. Adamson ; Millicent—Messrs. H. F. L. Holzgreffe and H. Day ; Frances—Messrs. B. F. Feindler and T. J. O'Brien. Besides the Minister and the Director, the Agricultural Department was represented by Messrs. W. J. Colebatch, B.Sc., Agric. (manager of the Kybybolite Experimental Farm and Superintendent of Agriculture in the South-East), W. L. Summers (Secretary of the Advisory Board of Agriculture), G. Quinn (Horticultural Expert), P. H. Suter (Dairy Expert), and D. F. Laurie (Poultry Expert).

STRIKING EXHIBITS.

A splendid display of exhibits, indicative of the fertility and possibilities of much of the land in the district, was provided, and evoked the enthusiastic encomiums of visitors from the North. There were dozens of varieties of excellent apples, several sorts of well-developed pears, walnuts, almonds, grapes, quinces, peaches, figs, citrons, lemons, tomatoes, potatoes, turnips, onions, parsnips, pumpkins, flowers, samples of wheat, oats, and rye in the grain, roots, Chou Mouellier, sorghum, panicum crusgalli, maize, Japanese millet, Kaffir corn, lucerne, and admirable Romney Marsh-Merino Comeback wool. The producers and branches represented were—Messrs. C. W. Saxon and E. W. Milne (Tatiara) ; S. H. Schinckel, R. D. Tolmer, G. Williams, D. McBain, L. Wright, W. Loller, and Wardle (Naracoorte) ; W. J. Colebatch (Kybybolite Government Experimental Farm) and C. Lacey (Kybybolite) ; R. Jackson (Kingston) ; T. W. Robinson and R. Fowler (Penola) ; Feuerheerdt Brothers (Lucindale) ; W. H. Milton, R. Smith, A. Wedd, H. G. Wheeler, A. A. Sassanowsky, Pritchard, C. Janeway (Mount Gambier).

VISITORS WELCOMED.

The Chairman of the Naracoorte Branch (Mr. E. 'Oe) presided, and extended a cordial welcome to the visitors. He was especially delighted to see the Minister of Agriculture and the Director. The latter had rendered splendid service to the farmers in the North, and he trusted, since his experience under the moist conditions in New Zealand, he would be able to do as much for the producers in the South-East.

CONFERENCE OPENED.

The Minister of Agriculture, in a vigorous and practical speech, declared the Conference open and wished it every success. As Minister of Agriculture he considered it his duty to attend all such engagements, so that he might come into direct contact with those who were working in the interests of the department, and thus increase his knowledge of its operations and achievements. One of the most educational and helpful factors in connection with the department was the Agricultural Bureau. The gentlemen associated with this organisation were engaged in a patriotic and national work, the value of which could not be overestimated. He appreciated their efforts in the highest degree, and recognised that they went a long way to improve the position of the man on the land and enhance the prosperity of the State as a whole. He was glad to be able to introduce Professor Lowrie, whom the Government had seen fit to bring back to South Australia. Nothing had given him greater pleasure than the reply which he received from Professor Lowrie, when the reconstruction of the department was under consideration. It was only one word, "Accept," but it took a great load off his mind. In the experts, as a body, South Australia was indeed fortunate, for they were equal to any to be found in the Commonwealth. Proof of that was furnished by the fact that lately he had had a most difficult task to parry the requests for the officers made by the gentlemen controlling the agricultural departments in the other States. As Minister, however, he had too much reason to value his officers to wish them to seek fresh fields, and considered he was only doing his duty to the great producing interests by offering them every reasonable inducement to remain in the State. The exhibits of fruit and other articles staged were highly pleasing, and he heartily congratulated Mr. W. J. Colebatch upon the comprehensive display from the Kybybolite State Farm. On looking over the numerous products they could not fail to be impressed by the value of experimental farms, and the benefit to be derived from having a man such as Mr. Colebatch in their midst. His achievements should stimulate them to go and do likewise, and if they got into difficulties he would always be prepared to advise and help them. For that matter, all the officers were at the disposal of the producers, and would promptly respond to calls for enlightenment and guidance. He was glad they had such a place as Kybybolite in the South-East, and looked forward hopefully to the results

that would follow the splitting up of Struan and Moorak. Some people were of the opinion that the Government had paid too much for the latter property. When the Minister of Agriculture in Victoria heard that negotiations were proceeding for the purchase of the estate, he remarked, "If you can get it for anything like £50 or £60 an acre do not let it go." He had added that there was no part of Victoria so promising from the productive point of view as that portion of the South-East, and on the occasion of the recent Conference of Ministers in Melbourne, warmly congratulated him (the speaker) upon the bargain which the Government had made. He had been surprised when travelling over various divisions of the railway system to find that the most difficult article of food to obtain was good fruit. The fruitgrowers should take this up, and he could assure them that he would do all in his power to help them. He was satisfied that if the fruit was available the travelling public would buy it, thereby deriving benefit themselves and incidentally helping the growers. While on the subject of fruit he wished to say that he would like to see the wives of farmers and others interested in the work pay a little more attention to the bottling of fruits. The Government was making special efforts in London and the provinces to bring before the British public first class exhibits of South Australian bottled, fresh, and also dried fruits, and he considered that in that connection the womenfolk could materially assist. The Government was prepared to purchase preserved fruits put up in a tasteful manner, and, what was more, would pay well for them. He had now made arrangements whereby each year new consignments of fruit and other products would be placed at the disposal of the Trade Commissioner (Major Norton) for exhibition purposes. Continuing, the Minister said he also desired to stimulate interest in the honey industry. Sometime ago Major Norton hooked orders aggregating 300 tons, but the apiarists, owing to the poorness of the flow and other reasons, had been unable to supply more than 20 tons. As the rates paid were remunerative they would all appreciate the advisableness, and indeed the need, for greater activity in the business.

DAIRYING AND PIG-RAISING.

Mr. J. W. Sandford (Chairman of the Advisory Board of Agriculture) questioned whether elsewhere there was anything of the kind so effective as the system of Agricultural Bureau Branches which existed in South Australia. Referring to the dairying industry, he had read a statement in the press that the average yield of the milking cows in Australia was one of the lowest in any dairying country—something like 243galls.—whereas in England it was somewhere between 500galls. and 600galls, and in Denmark it was even more. It was also stated that if in Australia the gross earning power of a cow was £6, and the expense of maintenance and management was £4, the profit was only £2 per head. If the earning power could be increased to

say £10 or £12 a cow an enormous gain would be the result. Australia was a big dairying country, and would become a much greater factor as improvements were effected and a better system evolved. Regarding pigs, there was considerable room for trade development; but it must be remembered that hogs would not bring profitable returns unless treated decently. Owing to the opening up of the English market consequent upon the failure of American supplies, a splendid opportunity was offered for Australia to export large quantities of pork and bacon. Shipments of both had been made already with gratifying success. He paid a fine tribute to the Roseworthy College as a training ground for young fellows who intended to go on the land, and submitted that there was no better institution of the kind in the Commonwealth. Mr. J. Miller (another member of the Advisory Board) indorsed Mr. Sandford's comments relative to the value of the Bureau and the Roseworthy College.

FORAGE CROPS.

Professor Lowrie was afforded an opportunity to address the gathering, and received a hearty welcome. Speaking generally, he said there was a tendency in the South-East at one time to imitate the practices followed in the northern part of the State, though lately the farmers had begun to realise that they must adopt other methods. Still as a whole they did not yet properly recognise the conditions under which they worked. Seeing that they had to deal with a relatively late spring, they must give considerably more attention to the cultivation of forage crops. It would pay handsomely to pursue that course thoroughly, and prove infinitely more advantageous than to save the labor by leaving the work alone and allowing the stock to suffer. Forage crops, managed with good judgment, would be one of the first—indeed absolutely the first—condition in securing the success which they all sought. Speaking from his experience in New Zealand, they could not appreciate too highly the value of barley as a winter forage crop, dun oats and sand vetches. He remembered a farmer in his neighborhood in New Zealand who, after mature deliberation, came to the conclusion that with his rape returning £6 an acre it paid him better than growing wheat, even though he was able to reap from 50bush. to 54bush. to the acre. He was not going to say that their rape would return the sum mentioned, but neither did their wheat yield up to 54bush. Both winter and summer forage crops could be made of the greatest utility in increasing the profits of their farms. They might say, "Too wet." What fallowing was in the North drainage would be in the South-East. The land which withstood the dry summer, and upon which the crops came to fruition in the most satisfactory manner was the land that was drained best. They must therefore without delay get rid of the element which cramped the fertility of their soils, increased their expenses, and reduced the value of their labors. It was a difficult problem, he knew, but one that was by no means unsolvable. The Government was making

a big effort to dispose of the surplus waters by constructing huge drains, but the men on the land must lead the waters into those drains. That would be accomplished without any serious trouble and by the display of a little ingenuity and neighborly determination to help one another. Reverting to the cultivation of forage crops, he was perfectly satisfied that a lot of the land in the South-East, properly managed, would carry five sheep and the lambs from July until the lambs were fit to send away. Some of it, he believed, would carry even more, and in advancing that opinion he was dividing Canterbury figures by two. Of course, to obtain those results they must manure. With a rainfall such as that in the South-East much heavier manuring was necessary than in the North. Every effort, for example, must be made to maintain a sufficient supply of nitrates, which were being constantly leached from the land by the action of the water, and in that connection they might ascertain the value of blood manure, which could be purchased from the Produce Depot. They should also make the best of all leguminosæ. The Professor then touched upon a subject of special interest to residents of Naracoorte, which is overrun with star thistle. The Bishop of Newcastle, he said, had defined agriculture as a controversy with weeds. He had been wondering whether the Noxious Weeds Act was dead and had been buried too long to be revived. Judging by what he had seen it was not only dead but decayed, so far as that particular district was concerned. If he were endeavoring to eradicate star thistle from his place it would be almost intolerable to find his neighbor on the other side of the fence busy sowing while he was cleaning. Apparently the only way to compel all to do their duty in connection with the weed pests was to resurrect the Act and drive it home.

EXAMINATION OF STALLIONS.

A paper by Mr. Reschke (Tatiara) on "The Examination of Stallions" was read, as follows:—"I fully approve of the examination of stallions, but my opinion is that a stallion should be examined internally as well as externally. First of all is his heart good, has he good nerves, cool temper, and good constitution? Mostly they are only examined about the legs and feet, and if they are not found sound then they are rejected. My experience is that these horses are unsound in the legs and feet it is caused mostly by overfeeding when a foal. They generally feed them with too much corn to force them up and make them big and bulky, and put too much weight on their legs, and perhaps do not give them room enough for exercise or on too soft ground. While that horse is growing and young, and up to about three years old, there is nothing showing on his legs, but after that, when he is forced to his full size and cannot grow any more, then his bones being too soft and too much weight on him, it comes out on his legs and feet, and he cannot stand the travelling. I mostly notice that stallions which gain certificates are only young horses which have never travelled, and after

they have travelled there are very few which will pass and gain certificates. My opinion is that it cannot be a disease in all cases, and I also think a stallion should be limited to a certain number of mares. At three years old they should take no more than 20 mares, and up to eight years of age they should take no more than 50, and after 10 years old they should not be allowed to travel any more, as they cannot do justice."

Mr. W. J. Colebatch said if Mr. Reschke's ideas regarding examination were carried into effect they would be soon in the position of not knowing where they were. The present system of examination was based upon a list of hereditary diseases that had been drawn up by a Royal Commission on Horse-breeding in England. Although the troubles related mainly to the limbs, hereditary ailments affecting other parts were also included. There had been a marked reluctance on the part of the owners of old stallions to send them forward for examination. The great objection to the existing system was that the owners of discarded animals suffered financially. Most farmers approved of the spirit of the scheme, but felt it when they or any of their friends were out of pocket through the failures of a horse to secure the Government certificate. He thought, however, that the difficulty could be overcome by the institution of a fund to compensate such owners. The whole thing could be done simply and effectively, and, he believed, without loss to the Government. The Government officers examined a certain number of three-year-olds each year. Roughly, 220 out of 300 were passed. The following year, when those animals were examined as four-year-olds, the percentage rejected would be very small. He submitted that the loss upon these rejects should be borne by an insurance rate upon the whole of the three-year-olds passed. The tax, of course, would diminish as the age of the horses increased. In answer to questions, Mr. Colebatch said foundering was due generally to carelessness on the part of the owner or an accident; consequently, if sound in other respects a foundered horse would receive a certificate. Ringbone might or might not cause lameness; usually it did. The lameness was generally seen during the inflammatory stage, while the ringbone was forming.

PAINT AND PAINTING.

Mr. H. Wheeler (Mount Gambier) contributed a paper on "The Value of Paint for Preserving Wood and Iron Work." He said—"It is well known that all woodwork exposed to the weather requires protection, otherwise it soon becomes weather-beaten and decays, especially if it should be soft. It is, therefore, wise to keep our dwellings and buildings well preserved with paint, otherwise in a few years' time we should have to replace several of the softest parts. Much has been said and written in recent years regarding the conditions under which paint will or will not produce satisfactory results. Here are a few fundamental principles that should be observed in order to

obtain the best results: First, it is necessary to procure the best brands of materials such as Champion's warranted genuine white lead, No. 1; Blundie, Spence & Co's. pure linseed oil; Mander Bros'. stainers; and Pratt's pure spirits of turpentine. These, properly mixed and applied, should give good results. In mixing paint care must be taken not to mix too great a quantity, for if it is exposed to the air too long before being used it becomes fatty, and when heated by the sun's rays soon blisters off. Some of the soft woods are very knotty and resinous. All knots and resinous veins should be well scraped and then receive a coat of patent knotting, which will dry quickly and hard, prevent the resin from coming through, and allow the paint to remain. Some people, when painting, put as much thick paint on in one coat as they can. This is a great mistake. It is far better to put two thin coats on with an interval of a week between, as they will then penetrate much better and preserve the wood. Paint should be about the consistency of thin cream and be brushed out evenly. It is most important that the surface to be painted should be thoroughly clean and dry. In coloring, many useful shades are got by using burnt Turkey umber, Oxford or yellow ochre, and burnt sienna. It is an interesting fact that farm implements are worn out more rapidly by exposure to the weather than by actual wear and tear. Seldom is shed room provided for wagons and farm implements, the usual custom being to leave them in some out-of-the-way place. Farm implements will last at least twice as long if not exposed to the weather, and their usefulness will be still further enhanced by coating them well with wagon and implement paint. Almost invariably wagons and farm implements have a good coat of paint on in the beginning. So soon as the original paint begins to wear off paint should be applied wherever the wood is left bare, otherwise moisture will penetrate and decay begins. If the surface left bare is iron, rust will accumulate. A dab or two of paint will often save pounds. Before painting ironwork it is necessary to remove all rust and grease. The Sherwin-Williams graphite paint (made in liquid form ready for the brush and also in paste form) is one of the best for the protection of iron and metal surfaces. Sometimes it becomes necessary to paint our roofs on account of rust setting in. One of the best paints for this is oxide, made in reds and browns. It is suitable for use on both wood and metal surfaces and is very durable. In estimating the quantity of paint needed it is worth remembering that 1 gall. of prepared paint over a smooth or fair surface will cover 300 sq. ft. two coats."

1912 CONFERENCE.

The afternoon session was inaugurated with a lively debate on the venue of the 1912 Conference. The Secretary to the Minister of Agriculture (Mr. Summers) suggested for consideration whether it might not be in the interests

of all concerned if the Conferences in future were held at the largest or most convenient centres. Those who attended the Bordertown Conference in 1910 would realise the difficulty of securing the proper representation of all the Branches when the engagement was held on the outskirts of the district. The same trouble had been experienced in the North. Mr. Bradley proposed that the next Conference should be held at Mount Gambier. Mr. Sassanowsky did not think the time had arrived for the Conferences to be held in only central places. If the Branches on the outskirts were excluded, much of the enthusiasm would be shut out. Although the gatherings conducted there might not be a success so far as attendances were concerned, a good purpose was served and useful interest in the work of the Branch was aroused. A big general Conference was held once a year in Adelaide, and it was highly desirable that at other times the headquarters of each Branch in a district should be the scene of a local Conference rotationally. Mr. R. Jackson proposed that the next Conference should be held at Kingston. Mr. Secker (Lucindale) seconded. Mr. Richardson (Penola) considered it was not fair to the experts to ask them to visit the outside places and address only small audiences. At the same time they had to remember that those very Branches might be injured by departing from the present system. He would support Kingston's claims. Professor Lowrie did not think it would be advisable to adopt Mr. Summers' suggestion in the present position of the Branches of the Bureau. There were other matters to consider besides the one of attendance. Personally he believed the interests of the organisations would be served best by the continuance of the existing system of holding the Conference rotationally in the different centres. The weaker Branches would undoubtedly be materially stimulated in that way. After further discussion it was resolved to hold the 1912 Conference at Kingston.

VERMIN.

A semi-humorous dissertation on this subject was provided by Mr. R. O. Lloyd (Kingston), who said, "My subject is not a very attractive one, yet it is one for bold attack and extermination. We may take the word 'vermin' to mean any noxious or mischievous animal or insect, but it will be quite sufficient to take a few of the animals to account in this paper. The animals we may call noxious are those which interfere with the successful operations of the farmer or gardener. These are various and numerous enough to demand our constant vigilance, and only that some of them are the prey of others the sons of Adam would have a still livelier time. As it is they help much to confirm the truth of the prophesy, "In the sweat of thy brow shalt thou eat bread.' Cows.—It is very disheartening for a man who has been trying to beautify his home to find on getting up some morning that his neighbor's cow has yarded herself in his front garden. A feed of roses,

geraniums, fuschias, &c., may improve the flavor of the milk, but if the welfare of the cow depended on the good will of the owner of the garden, things would be looking bad for the cow. A cow is right in her place—out of it she must be classed as vermin. She is protected vermin, however, and owners of crops and gardens have to take precautions against her trespass. If it is my own cow I find a forked stick 4ft. or 5ft. in length fast to her neck will keep her the right side of the fence. For the other fellow's cow barbed wire, strained tight, is the most effective deterrent I can name. Cats.—As a gardener I have found cats deserving of the title vermin. To find that your cat has called together all his neighbors and friends, and have been doing a romp on your seed bed while you slept is not conducive to good temper, especially if the dog has done a good sprint across the same in the act of dispersing them. A cat is property at home, away from home vermin, and should you find him too noxious there are various ways of removing him, and of these perhaps lead pills will be found most efficacious. Dogs.—A good dog is almost indispensable on a farm, and care should be taken to keep him out of trouble; but lots of people keep dogs that cannot be called good by any stretch of imagination, and should you find your sheep getting scared and occasionally one torn, then look with suspicion on every dog that appears unaccompanied by his owner. Pieces of liver charged with strychnine will help you to identify the marauder. Rabbits.—Of all the pests rabbits are easily worst. Everyone will grant that, and everyone has his one fancy way of dealing with them. Whatever means of extermination are used I would favor first wirenetting the paddock, then keep up a sustained effort till the last rabbit is dead. Even then, where 1½ in. mesh is used, it will be necessary to keep on the watch, as small rabbits will frequently get through. It will be found that rabbits do not take poison so well after the first laying, and to overcome this difficulty a change of bait will be found to help considerably. Pollard is the bait generally used, and apple jam strychnine is also much in favor. The leaves of shrubs which the rabbits like will be found good. These will vary in the different districts, but can soon be found on observation; and where none are known apples and carrots will meet the need. A good strong syrup should be made by dissolving 1lb. dark sugar in a pint of water and, say, ¼ oz. of strychnine dissolved in vinegar. First cut the shrub, apple, or carrot into size for bait, dip in syrup, and drain on galvanized iron. Mice.—Mice are deserving of some consideration here. Scarcely anything edible is too sacred for them to sample, and if all the damage done by them in the year were taken into account it would be found to be immense. So far as my experience goes I have found Phoenix poisoned wheat most effective; but care has to be exercised in using it lest fowls and other domestic creatures should be destroyed as well. A good plan is to have a box with holes bored at or near the top for the mice to go in or out and place the wheat within. This may be placed by stacks or in sheds, and very few grains will ever be

carried out. This plan should do for rats as well. I have sometimes had my tomatoes attacked by bush rats, and have got rid of them by laying the wheat in the tracks."

Messrs. Saxton and W. Shoebridge (Bordertown) dilated upon the splendid success that had attended the use of Messrs. Finlayson & Cousins' patent method of destroying rabbits.

VARIOUS TOPICS.

The Kybybolite Branch tabled the ensuing questions:—"What are (a) the best methods of eradicating sorrel; (b) the best variety of wheat for wet land; and (c) will wheat or oats deteriorate and turn to drake in wet places?" Professor Lowrie considered that the best plan of coping with sorrel was to drain the land and sweeten it with applications of lime. The plants could be reduced considerably with the help of sheep, and by getting the land into better heart. He advocated the frequent use on cultivated ground of the harrows, followed by the chain harrows. The latter assisted to pull out the weeds, after they were loosened at the roots. Another implement that would probably be found useful was one used on irrigation areas and known as the "slicker." After land had been worked up this implement could be used with advantage. Mr. Jackson (Kingston) said he had seen sorrel growing out of a heap of lime. Professor Lowrie agreed that it was possible, but that did not disprove the established fact that aeration and improvement of the soil by liming tended to decrease the sorrel. Mr. Holzgreffe (Millicent) said he had trouble with sorrel until he sowed the paddock down to grasses for sheep. It was a useful sheep food. Professor Lowrie recalled the time when farmers at Mount Gambier raised the cry that the country was wheat-sick, and sorrel such a menace to profitable occupation that they sold out at about £7 an acre, and took up land at Millicent at about £5 an acre. That was before the old system of farming was replaced by rotational cropping, potato-growing, and sheep. Sheep were so fond of sorrel that at Lincoln College, New Zealand, on one occasion a flock turned on to a good field of it ate so greedily that several were paralysed by the next morning.

Concerning the best wheats for wet districts, Mr. Colebatch mentioned that wheats like Dart's Imperial seemed to be the most suitable. However, he did not know of one variety that could be depended upon to give payable returns in an average of seasons at Kybybolite. He thought it would be better to pay more attention to "drying" the land than to the work of producing a wheat that would flourish under exceptionally wet conditions. He did not think any wheat in the world would stand the amount of rain experienced last year, unless the country was first drained. Professor Lowrie was inclined to agree with Mr. Colebatch. Farmers would do well to pay more attention to oats. Stock must be an important factor, and with oats there

was so much grain for the market, besides straw of good feeding value. There was an old wheat at home, Rivett's corn, which stood wet conditions well, but it was not of good milling quality. Under a 40in. to 50in. rainfall, wheats that did best in the 12in. to 15in. rainfall belt could not be recommended. If they tried wheat, he advocated sowing a late sort in the autumn, when the ground was still warm. Mr. S. H. Schinckel said he had found Gallant wheat do well in wet years. It had never failed with him until this year. He had grown 3 tons 2cwts. to the acre. He had also found Yandilla King do well, even on low swampy land. Mr. Tavender (Lucindale) said he had experimented with French wheats, but had found them failures under moist conditions. Professor Lowrie said it was impossible for wheat or oat to degenerate into drake. He would not assert that it would be impossible to hybridise drake and oats or drake and wheats, but it was most improbable. The prevalence of drake in some seasons was primarily due to the presence of drake among the cereals sown or in the soil.

ORCHARD MANAGEMENT.

The Horticultural Expert (Mr. G. Quinn) gave an exceedingly instructive address on "Winter and Summer Pruning." Dealing with the habit of some apple trees to fruit heavily one year and be practically barren the next, he explained that Bailey's experiments in America had shown that the fruiting of the tree could be materially influenced by reducing the crop which promised to be heavy in the early stages, thus inducing a better yield in what would otherwise be a comparatively poor season. Tests over extended time had demonstrated that the trees thrown out of their usual habit generally returned to it after a few years. The application of that practice might enable growers to work shy varieties so that a proportion would give a heavy crop each year.

EVENING SESSION.

When the delegates assembled to begin the evening session they were reinforced by the presence of a considerable number of ladies, who appeared to enjoy the interesting character of the addresses and discussions. The business was opened with a suggestive paper on "Little Things," by Mr. E. W. Milne (Tatiara), who said—"For the past few years the seasons have been favorable and prices have been good, so we have been tempted to go in largely for wheat production, and perhaps have neglected the little things as beneath our notice. There are many things that we might profitably grow that would help to keep things going while the main crops of oats and wheat are paying for our land or swelling our banking accounts. I would advocate gardens about the home; not on a large scale to take up too much of our time, but to grow fruit and vegetables for home requirements. With judicious use of manure and water we can grow most vegetables to perfection and also fruit. We might also grow peas, mangolds, rape, and grasses, so

that more stock could be kept on small farms. Then there are little things about the farm which, if attended to, would save waste, and a penny saved is a penny earned. Thatching our haystacks is a small thing which does not take long, but would often save a lot of good hay. I know that a year or two ago tons of hay was lost through neglect of this small item, and I was one of the losers; but I learnt my lesson, and so thatch my stacks as soon after harvest as possible. Taking care of machinery may be a small matter, but it prevents a lot of loss; not only do I mean by putting it away into a shed when not in use, which I consider an important item, but looking after it when in use, keeping bolts screwed up and bearings tightened, and a judicious use of oil. I have heard that a pennyworth of oil saves 5s. worth of castings; and I believe that is true if put into the castings at the right time, but it is not always attended to. I have seen oil dripping off parts of the machine that are not bearings. For instance, I have seen a windmill with the oil running down its legs to the ground. That is waste. I do not like to see a machine in the paddock with the oil all over the woodwork, although in some cases it cannot be avoided. Farmers should grease their harness and pay attention to loose straps and buckles. It is not profitable to find straps and buckles off when we should be starting ploughing. Another matter (although it is perhaps not so small as some of the others) is the working of horses and machinery up to their capacity. For instance, if we have four horses, a plough, stripper, or harvester capable of dealing with 100 acres and only treat 50 acres, we are losing on our capital. I think the working of stock and implements up to their full capacity is the difference between loss and profit, and we want the profit. Grading seed wheat is another small point worthy of attention. I have been surprised to see the amount of cracked grain and drake that comes out of apparently clean wheat. I remember some years ago I took the prize at our show with some wheat, and the agent took some of it and put it through the grader. The result surprised me, so I purchased a machine forthwith. I consider it better to take the small grains out and feed pigs or fowls with it than to sow it in the ground to grow stunted wheat with small heads. I have an idea that sowing the small grains is partly the cause of so much short wheat amongst the other. Land is too valuable and wheat too good to sow waste and weeds in the wheat paddock, while feeding pigs and poultry proves profitable."

(To be continued.)

AGRICULTURAL BUREAU CONFERENCE.

WEST COAST BRANCHES.

As the outcome of efforts made by some of the West Coast Branches a Conference was held at Tumby Bay on Saturday, March 25th. Delegates were present from the following Branches, viz.:—Lipson, Shannon, Koppio, Yallunda, Green Patch, Butler, and Mitchell.

There were also present Mr. George Jeffery (representing the Advisory Board of Agriculture), Mr. A. E. V. Richardson, M.A., B.Sc. (Agric.) (Assistant Director of Agriculture), Mr. J. F. McEachran, M.R.C.V.S. (Government Veterinary Surgeon), and a number of visitors.

OPENING REMARKS.

The Chairman (Mr. E. Provis), on behalf of the Lipson Branch, whose members convened the Conference, voiced a hearty welcome to the delegates. Mr. Jeffery formally opened the proceedings. It was gratifying, he said, to find that at such a comparatively early stage in the Bureau work on the Peninsula it was possible to bring together such a representative gathering of primary producers. It augured well for the future of the Bureau movement when members were prepared to come such long distances to discuss matters of interest to the farming community.

DESTRUCTION OF MALLEE SHOOTS.

The first paper of the morning session was read by Mr. J. J. Cronin (Shannon) and dealt with the destruction of mallee shoots. The most economical and effective method of destroying the shoots, he said, was to burn them three or four times with the stubble. A 12bush. or 14bush. crop would leave stubble enough if rolled down to secure a good fire. Where the stubble was light, however, it was best to use a fire rake. An 18ft. rake could be made for about £6 10s., and a pair of plough wheels would carry it. With such a rake drawn by two horses about 35 acres per day could be burned by one man, and 90 per cent. of the shoots would be killed. It was advisable to knock the stubble down beforehand, however, and he had found a piece of heavy anchor chain, about 20ft. long, spread with a piece of mallee, and pulled by one horse, would do 40 acres in a day. It was not quite as effective as a roller, but as it was so quickly done was preferred by most who had tried

it. Shoots should be cut at least once a year, and the deeper the ground was ploughed the more quickly they would die. He thought it advisable to crop the land for three years in succession at first—the first two years with wheat, and the third with oats for hay. After that the land would be fallowed, and the stubble from the succeeding crop again burned. Shoots were more difficult to deal with in heavy than in the lighter soils. It was a very great mistake to cultivate larger areas than could be properly attended to, and so let the shoots get the upper hand.

SUMMER FODDERS.

Mr. G. Howard contributed the following paper dealing with the provision of summer fodders:—"Lucerne, in my opinion, comes first on the list of fodders, and it will grow almost anywhere if given proper attention. It can be cut or eaten off several times during the year. It would pay every farmer to have a lucerne plot as a tonic for his horses and cattle during the long and dry summer. It is a plant of great value when sown in a hay crop, as one can let the hay get on the ripe side before cutting and still have a nice green sheaf. Last year I sowed 10 acres of lucerne with oats, and had splendid results. I sowed in May, and the binder cut fully 18in. of the lucerne in the sheaf. Since cutting I have had seven horses on that plot off and on for about two months, and it is now about 8in. or 9in. high again. Those who intend to plant lucerne should choose a piece of strong land and not be afraid of ploughing it deeply. Harrow it down to a fine tilth. Secure the seed from some reliable seedsman, taking care that it is free from dodder. Sow from 5lbs. to 6lbs. of seed with about 100lbs. of super. to the acre. Some favor more seed, but mine came up fairly thickly. Mix the seed in the super., but do not let it remain too long in the super. before sowing. Allow the drill to run as shallow as possible in order that the seed may not be buried too deeply. About a bushel of oats or wheat should be sown at the same time as a protection. The binder, at haytime, will just serve to make the lucerne plants stool out nicely. It should be sown about May to let it get well rooted before the summer sets in. Experts say it should not be allowed to seed the first year. Next to lucerne comes Sheep's Burnett, which is sown in a similar way, and is credited with sometimes growing when the former will not. Mangolds are a good root fodder, and will often grow where nothing else will. I am confident that thousands of tons of this valuable root crop could be grown in some of the now useless salty ground near Tumby Bay, as that kind of soil, with a little manure added, is just the sort for mangolds."

MANURES FOR WEST COAST.

The afternoon session was opened by a paper from Mr. S. F. Potter (Lipson) under the above title. At the outset he said that this should really be termed the West District, and that as the rainfall ranged from 25in. in the southern

part to 10in. in the extreme western portion of the Peninsula, it was practically impossible for farmers in any one hundred to speak of the requirements of the West Coast as a whole. From his experience in the hundreds of Hutchinson and Yaranyacka, however, he had come to the conclusion that a dressing of 1cwt. of super. gave the best average results. From experiments he had conducted on behalf of the Department of Agriculture since 1902 he found that superphosphate paid best. Super. applied at 70lbs. to the acre gave 20½bush.; 112lbs., 26bush. 54lbs.; 140lbs., 27lbs. 4lbs.; and 224lbs. to the acre gave 28bush. The unmanured plot gave 3bush. an acre, and 70lbs. of Thomas phosphate realised only 12bush. an acre. He found that for the first crop from new land 70lbs. of super. gave a good return, but as soon as the land was cleared of stumps, &c., and could be decently worked 112lbs. of the manure should be applied to the acre.

MIXED FARMING. -

Mr. Sinclair (Green Patch), in a short address, spoke more particularly of the utilisation of the land at the southern end of the Peninsula. The Port Lincoln district, he said, was admirably adapted to dairying, and summer fodder could be grown with very little trouble. Fattening lambs and pigs could be profitably combined with dairying and sheep-raising. There was also a great future in fruit and vegetable growing. The climate was ideal for this, and fruit trees planted, even in inferior soil, were doing wonderfully well. A matter which should be considered by farmers and others in all parts of the Peninsula was the planting of timber trees. Pines and sugar gums would grow almost anywhere. The State Forest Department was prepared to assist, and it devolved upon the landholders to do something in the way of afforestation.

POST MORTEM.

At the conclusion of the afternoon session the Government Veterinary Surgeon, assisted by Mr. F. E. Place, M.R.C.V.S., conducted a highly interesting *post-mortem* examination on an aged mare. A large and appreciative gathering witnessed the operations. Mr. McEachran explained in detail the digestive, respiratory, circulating, and urinary systems, and dealt with various pathological conditions observed during the examination. At the conclusion of the demonstration he answered a number of questions.

EVENING SESSION.

The evening session was opened with a practical and instructive address by Mr. G. Jeffrey of the Advisory Board of Agriculture on "Sheep on the West Coast." As a means of augmenting their incomes Mr. Jeffrey advised farmers to associate wheat-farming with the raising of sheep. That would necessitate adequate fencing and the outlay of a

little money, but the farmers would be handsomely compensated for the labor and expense. He recommended beginners to procure their ewes from the local stations, and to buy big-framed rams from the studs on the mainland. After a while they would be able to breed their own ewes, but for many years to come the rams should be selected from outside. The characteristics of the big-framed Merino were constitution and a lengthy, robust fleece. The district would always keep the quality fine. Mr. Jeffrey was emphatic in denouncing the practice of leaving the bellies on the fleeces, and stated that though lately there had been considerable improvement in this respect, nevertheless many of the West Coast clips were marketed in the objectionable fashion referred to, and were discounted accordingly. As they grew a high-quality wool they ought to give it every chance to sell to the best advantage.

FARMING IN SCRUB COUNTRY.

The Assistant Director of Agriculture delivered an address under this title. Scrub farming was characterised by large individual areas under cultivation, small average yields, and a dreary monotony in the cropping system. He explained the chemical, physical, and biological factors underlying soil fertility, and indicated the influence these had in determining the treatment of the soil. Continuous cropping was characteristic of the early stages of scrub farming on the West Coast, and was, perhaps, a necessary preliminary for the suppression of mallee shoots. A system of fallowing, however, should be introduced at the earliest possible moment, as it was an absolute essential to successful farming in these districts. No system of soil cultivation could be complete until provision was made for the association of live stock, and particularly sheep, with the growth of wheat. Mr. Richardson discussed at length the problem of manuring scrub country. Phosphoric acid, potash, and nitrogen were the three elements likely to be deficient in ordinary soils. Superphosphate was found to be indispensable on nearly all South Australian soils, but so far as potassic and nitrogenous manures were concerned, they were only likely to be profitable on the light, white sandy soils characteristic of much of Eyre's Peninsula. The usual dressing of super. on the West Coast was about 70lbs. an acre, but it must be remembered that heavier dressings were of indirect value in stimulating the subsequent herbage and in getting the land in good heart. The various fungoid diseases to which wheat was peculiarly liable, namely smut, bunt, rust, takeall, and the methods found most beneficial in preventing these pests were described. In conclusion he described the experimental work about to be undertaken at the Government Experimental Farm at Yeelanna, and stated that the Agricultural Department would do its utmost to help the settlers in the new areas in solving problems peculiar to the agriculture of the West Coast.

COMMON AILMENTS OF HORSES.

The concluding item was an illustrated lecture by the Government Veterinary Surgeon, who dealt with some of the common ailments of the horse, including colic, indigestion, worms, laminitis, lymphangitis or weed, tetanus, canker, sandcrack quittor, fistulous withers, strangles, and influenza. The lecturer stated that most of the diseases of the digestive organs that were commonly encountered were caused through dietetic errors. He advised farmers to pay particular attention to the feeding of their horses, emphasized the necessity for good clean food and water, and deprecated the giving of large quantities of dry food whilst horses were not at work. The objectionable habit of heaping fresh food on the previous day's "leavings" was also condemned, and in strong terms Mr. McEachran recommended farmers to rectify insanitary conditions in and around the stables and yards. He ascribed the existence of many of the parasite and bacterial diseases to the bedding of horses with manure, and the subsequent contamination of food and water. The causes, symptoms, and treatment of the various ailments were clearly defined, and in connection with the treatment of horses for *Strongylus armatus* (red worms) in the large intestines the lecturer mentioned that this trouble was extremely common. The practice, however, of administering drastic drugs to sleek, healthy looking horses simply because a few worms had been seen among the manure in the yards or stables was dangerous, and should be discontinued. Hereditary unsoundness of horses was described and illustrated, and a large number of excellent lantern slides on foaling were exhibited and explained.

Conference closed.



ROSEWORTHY AGRICULTURAL COLLEGE.

FOURTH REPORT ON THE PERMANENT EXPERIMENT FIELD:
SEASONS 1909-1910 AND 1910-1911.

By ARTHUR J. PERKINS (Principal Roseworthy Agricultural College) and
W. J. SPAFFORD (Assistant Experimentalist).

INTRODUCTORY.

Three separate reports on the Permanent Experiment Field of the Roseworthy Agricultural College have already been published in the *Journal of Agriculture* of South Australia, and issued subsequently in pamphlet form. The first report, dealing with the 1905-06 season, appeared in the April, 1906, number of the *Journal*. In this report the objects that led to the establishment of a permanent experiment field are indicated, together with a full description of the nature of the experimental work originally contemplated. The second report appeared in the September, 1907, number of the *Journal*, and dealt mainly with the 1906-07 season. The third report appeared in the June, July, and August, 1909, numbers, and included, in addition to an account of the 1907-08 and 1908-09 seasons, a general review of results secured over the first four seasons.

The fourth report will give an account of the 1909-10 and 1910-11 seasons, with which will be incorporated a general analysis of the results of six years' work, to the extent that they may serve to elucidate points of general interest in local farming practice.

For the benefit of those who are not familiar with the earlier reports it should be stated that the Permanent Experiment Field consists of 122 acres, divided up into 61 plots, two acres in area each. The soil, on the whole, is very uniform in character, consisting of fairly heavy loam, and representing typically good wheat land. The only irregularity in the character of the soil is represented in portion of three or four of the plots by the presence of blocks of travertine limestone, with its characteristic covering of loose, light soil.

DISTINCTIVE FEATURES OF THE SIX SEASONS.

We summarise below what have been the distinctive features of the six seasons concerned. In the first place in Table I. will be found the monthly rainfall registered each year, together with the mean results recorded at the College over the past 27 years.

TABLE I.—*Showing Monthly Distribution of the Rainfall on the College Farm from 1905 to 1910 comparatively with the Mean Distribution of the past 27 Years.*

	1905.	1906.	1907.	1908.	1909.	1910.	Means of past 27 Years.
	inches.	inches.	inches.	inches.	inches.	inches.	inches.
January	2.27	0.00	0.05	0.48	0.75	1.72	0.89
February	0.13	0.08	0.33	0.43	0.28	0.00	0.47
March.....	0.08	2.64	0.17	1.09	1.17	4.43	0.76
April.....	2.10	0.45	2.79	0.76	1.91	0.23	1.88
May	2.24	0.99	1.96	3.36	2.89	3.20	1.78
June	2.07	2.84	1.57	2.89	1.84	2.81	2.69
July	2.58	1.99	1.15	1.42	3.80	2.86	1.88
August	0.87	3.35	2.25	1.79	4.56	1.32	2.13
September	1.17	2.65	1.08	3.09	1.52	2.64	1.71
October	2.95	1.77	1.22	2.15	2.55	2.55	1.87
November	0.25	2.26	1.86	0.07	2.08	1.18	1.04
December	0.00	0.70	0.62	0.21	0.70	0.93	0.75
Yearly totals.....	16.71	19.72	15.05	17.74	23.05	23.87	17.65

The leading features of the six seasons may be described succinctly as follows :—

Season 1905-06 was characterised by very favorable seeding weather ; by a cold, wet winter without, however, much frost ; by a late cold spring ; and finally by very favorable ripening weather. Both hay and grain yields were exceptionally heavy, and of excellent quality. The general College farm yield of hay was represented by 3 tons 5cwts. 67lbs. from 60.3 acres, whilst the general wheat average was represented by 24bush. 11lbs. from 212 acres.

Season 1906-07 opened with unfavorable seeding weather, followed by a very dry, though mild, winter. The spring months were on the whole unusually moist ; hot weather accompanied by north winds set in, however, rather suddenly, with the result that much of the crops blighted off. Eventually the hay crops proved bulky, but trashy, and much of the grain was shrivelled and inferior in quality. The general hay average of the College farm was represented by 2 tons 11cwts. 90lbs. from 93 acres, whilst the general wheat average was represented by 14bush. 30lbs. from 318 acres.

Season 1907-08 opened with favorable seeding weather, succeeded by a very cold and dry winter, 18 heavy frosts being recorded over the winter months. The spring months were both dry and hot, with the result that both hay and grain yields were light, although good in quality. The general hay average on the College farm was represented by 1 ton 15cwts. 108lbs. from 51 acres, and the general wheat average by 13bush. 20lbs. from 178 acres.

Season 1908-09 opened with favorable seeding weather, followed again by a cold, dry winter, amply compensated for, however, by copious September and October rains. Ripening weather was also very favorable, with the result that hay and grain crops were both heavy and of good quality. The general hay average on the College farm was represented by 2 tons 7cwt. 5lbs. from 112.8 acres, and the general wheat average by 22bush. 14lbs. from 258.2 acres.

Season 1909-10 again opened with favorable seeding weather, albeit at times sufficiently showery and wet to interfere with field work. The winter months proved exceptionally wet, and many crops in the neighborhood were practically drowned. The spring months were moist, and all crops most promising in appearance until the arrival of a sudden spell of hot weather, which had the effect of blighting off the crops that were most forward and rank. Eventually both hay and grain crops proved very heavy and of exceptional quality. The general hay average on the College farm proved to be 2 tons 15cwt. 68lbs. from 145.3 acres, and the general wheat average 25bush. 5lbs. from 328.47 acres.

Season 1910-11 was characterised chiefly by unfavorable seeding weather and exceptionally wet winter and spring months. Summer, on the other hand, proved favorable to the final development of the crops and the ripening of the grain. Eventually hay crops proved very heavy, but grain crops light and poor in quality. The general hay average on the College farm was represented by 3 tons 8cwt. 21lbs. from 36.6 acres, whilst the general wheat average was represented by 17bush. 26lbs. from 328.84 acres.

AVERAGE RETURNS OF THE PERMANENT EXPERIMENT FIELD FROM 1905 TO 1910.

We now propose showing what have been the average returns from the Permanent Experiment Field over the course of the six seasons under review. It is not possible in this connection to take into consideration the yields of every plot that might have been under cultivation in any given season; and this because the treatment of many of the plots has varied from year to year, and their introduction into any general average would only serve to vitiate any value it might have for general comparative purposes. For the purpose therefore of illustrating the influence of each season on the Permanent Experiment Field we have taken in each year all plots alternately under wheat and bare fallow that have received practically the same treatment since 1905. This gives us for each year 15 plots, variously manured, and representing about 30 acres in area. Details having reference to the average of these plots are shown below in Table II. for each year.

TABLE II.—*Showing Average Returns of Fifteen Plots of the Permanent Experiment Field, Sown on Bare Fallow, from 1905 to 1910.*

Year.	Total Produce per Acre.			Grain per Acre.		Straw to 60lbs. of Grain.	Weight of Bushel.
	tons	cwts.	lbs.	bush.	lbs.	lbs.	lbs.
1905.....	2	11	68	28	30	146	63
1906.....	2	3	12	20	3	182	58½
1907.....	1	2	35	16	8	94	63½
1908.....	2	8	88	30	28	120	64
1909.....	2	13	30	30	0	138	63
1910.....	2	7	28	20	54	195	63½
Means.....	2	4	44	24	21	146	62½

GENERAL DISCUSSION ON THE SIX SEASONS' RETURNS, BEARING ON THE DISTRICT AND THE GENERAL FARMING PRACTICE IN VOGUE.

There are several points arising from the general results secured in the Permanent Experiment Field over these six seasons to which we wish to draw attention. In the first place we believe that they will enable us to set out roughly the general working conditions of the district, and to indicate what form of farming practice many years' experience has imposed upon it. We are led to insist on this point, with a view to avoiding the confusion of ideas so apparent at the Conference on Dry Farming recently held in Adelaide. This Conference owed its origin, we believe, to an idea—transplanted from America—to the effect that it was possible to establish a definite and binding formula which might serve as a basis to farming practice in all arid regions alike. The mere statement of the question, however, sufficed to put it out of court; not only was there no unanimity as to what was likely to prove the best practice in arid country, but opinions even varied on the mere definition of aridity. Total rainfall is evidently no criterion in the matter, for if we assume an arid region to constitute a district in which, under present methods of farming, crops cannot be grown to advantage for lack of sufficient moisture, we find that different districts hold different opinions as to the amount of rain essential to safe farming. Thus, at the Conference, side by side with more or less chimerical ideas of raising profitable crops of wheat on 5in. to 6in. of rain, we found New South Wales delegates questioning the sufficiency of a 20in. rainfall. We are, of course, aware that in such matters rainfall distribution counts for much; but in our view by far the most important point is the extent to which general local practice has been made to harmonise with the conditions of an average season. We are bound to admit that if a district is characterised by essentially capricious and unreliable seasons, safe farming must always prove a difficult problem; if experience is to count for nothing, then farming degenerates into a huge gamble. Nevertheless, it would strain our convictions to the utmost to admit that no form of farming could be devised which would render absolutely

safe any 20in. rainfall country. Of this much one may feel reasonably certain, and that is the utter impossibility of abiding by empirical formulæ of alleged universal application. The difficulties attending the farming of arid regions must be solved locally or not at all; and, in our opinion, no central committee for the Commonwealth, such as was suggested at the recent Dry Farming Congress, and wisely rejected, could possibly do much good towards solving purely local problems.

We shall now proceed to examine the general practice of the district in which we are situated. We are very far from wishing to commend it indiscriminately to all alike; we feel, however, that what has succeeded here may prove equally successful in localities similarly situated, and in order to avoid misconceptions we wish to define clearly the conditions under which we happen to be working.

At the outset it is as well to note that, with the exception perhaps of 1907, the plots of the Permanent Experiment Field have not yet had to run the gauntlet of an excessively dry season. We may remark, however, that of the six seasons under review two (1905 and 1907) registered less than the average rainfall, one (1908) registered a normal fall, whilst three (1906, 1909, and 1910) registered falls in excess of the normal average. The general wheat average of the plots sown on bare fallow was represented over these six years by 24bush. 21lbs. The lowest yearly average recorded was represented during this period by a little over 16bush., and the highest by 30½bush. to the acre. The hay, or total produce yields, were equally satisfactory, the average for the six years was represented by 2 tons 4cwts. 41lbs., the lowest yearly average being 1 ton 2cwts. 35lbs., and the highest 2 tons 13cwts. 30lbs.

We are aware that it is customary to attribute the farming successes of latter years to an abnormal increase in the annual rainfall. We are under the impression that sufficient importance is not attached to the fact that the accumulated experience of the farming community to-day is greater than it was 15 to 20 years ago; and that latter-day practice approaches more nearly to the special requirements of an average season, and is to that extent an improvement on earlier and less successful efforts. There is no difficulty in proving, for this district at all events, that there has been no appreciable increase in the average rainfall relatively to the seasons of which we have any record. Table I. shows the yearly average for the district, calculated for 27 years, to be 17·65in. If we divide these 27 years into three periods of nine years we shall find the average rainfall to have been 18·96in., from 1883 to 1891; 16·88in. from 1892 to 1900; and 17·17in. from 1901 to 1909.

It should be added that as recently as 14 to 15 years ago it was the custom to describe the Roseworthy district as poor dry country in which farming must always remain a more or less precarious adventure. To-day, with no appreciable increase in the rainfall, we have no hesitation in describing it as

one of the safest farming districts in the State. This leads us back to our contention that frequently any given locality is described as arid so long as its farmers have not learnt how best to cope with it.

RAINFALL DISTRIBUTION OVER THE GROWING PERIOD OF WHEAT.

It must be clear that both the growth and yield of any crop will depend very largely, if not exclusively, on what amount of rain falls over the course of its vegetative or growing period. This fact has led to a certain amount of confusion in agricultural writings, in which at times we find indicated the total yearly rainfall, and at others only the rain falling strictly within the period of growth of the crop. On the other hand, where a year's bare fallow is made to precede the wheat crop, as is the case in this district, it is customary to assume that portion at least of the rain falling on well-tilled fallow ground must be of benefit to the crop of the succeeding year. To our minds, within certain limits, there can be no doubt that such must be the case; indeed, in support of this view, we believe that we can bring from some of the plots of the Permanent Experiment Field indirect evidence. This, however, is a question that we reserve for future discussion. In the meantime we have set out below in Table III. what proved to be the distribution of the rainfall over the six seasons with which we are concerned.

TABLE III.—*Showing Rainfall Distribution from 1905 to 1910.*

Year.	Seeding and Winter Rain May-July.	Spring Rain August-October.	November Rain.	Total Useful Rain.	Rain Without Influence.	Average Grain Yield of Plots.	Rain on Fallows of Preceding Year, August-April.
	inches.	inches.	inches.	inches.	inches.	bush. lbs.	inches.
1905	6.89	4.99	0.25	12.13	4.58	28 30	9.28
1906	5.82	7.77	2.26	15.85	3.87	20 3	8.41
1907	4.68	4.55	1.86	11.09	3.96	16 8	14.07
1908	7.67	7.03	0.07	14.77	2.97	30 28	9.79
1909	8.53	8.63	2.08	19.24	3.81	30 0	11.42
1910	8.87	6.51	1.18	16.56	7.31	20 54	17.79
Means of 27 years	6.35	4.51	1.04	11.90	5.75	—	11.30

In Table III. we have divided the rain that may be deemed useful to growing crops into three sections. The first section includes rain falling from May to July inclusively; this we have called seeding and winter rain. We are, of course, aware that in this district early-sown crops are frequently in the ground some time in April. In the plots of the Permanent Experiment Field, however, in which we have always sown early varieties, seeding operations have always taken place between the second and last week of May; indeed for the whole district, whenever early varieties are availed of—and these early varieties are eminently suited to the district—May may be considered

the normal seeding month. It will be noted that over 27 years the mean seeding and winter rainfall has been represented by 6.35in. In our view the ultimate success of the harvest depends primarily on the existence of normal conditions at this time of the year, viz., favorable seeding weather, followed by good growing winter weather. Season 1907-08 gives a striking example of the inestimable value of a good start, that is implied in favorable seeding weather, for, except for the latter, in 1907 everything appeared to conspire against the ultimate success of the crops. A dry and exceptionally frosty winter was followed almost without breathing interval by a hot and dry spring, accompanied by frequent north winds. Fortunately November proved more than usually favorable, and ultimately the plots sown on fallow ground averaged over 16bush. to the acre, which, notwithstanding an unfavorable year, they owed almost exclusively to an excellent early start. Of the six seasons under consideration four opened with favorable seeding conditions, and two (1906 and 1910) with unfavorable ones; and, as a natural consequence, notwithstanding exceptionally favorable conditions in other directions and an abundant rainfall, the yields of the plots in these two years were much below what might otherwise have been expected of them. In this district, therefore, and others similarly situated let healthy plants peep sturdily above clean fallow ground in the month of May within 10 to 12 days of seeding operations, and an average harvest may already be said to be practically assured. How much above the average this harvest is likely to prove will depend no doubt upon other conditions, and particularly upon spring weather; but given good germination and healthy early growth complete failure is almost unthinkable. Our practice therefore may be said to be based upon favorable seeding weather and a moderately moist winter. Excessive moisture in winter is calculated to take us quite as much by surprise as unexpected drought, and will prove almost equally detrimental to good general yields. We have a good proof of this in the 1910 returns, when dry seeding weather was followed by torrential winter rains and an equally wet spring. No doubt in this instance our normal practice did not correspond to the abnormal conditions of the weather, and we were very far from reaping all the advantages of a heavy rainfall.

The second column in Table III. indicates the spring rain, extending from August to October inclusively. It will be seen that over this period the average of 27 years is represented by 4½in. There is no doubt that these months must constitute the most critical period in the life of wheat crops whenever the winter rainfall has fallen short of the normal average. This proved to be the case to a very marked degree in 1907, when even the normal fall of 4½in. was insufficient to compensate the winter shortage. Of late years, however, we have had no reason to complain of an insufficiency of spring rains. It is to be noted that a wet spring has its peculiar disadvantages, for if it be combined with unusual warmth it enables red rust to make serious inroads

into future yields ; but it must be recognised that, for reasons it would be difficult to explain, this disease appears to have lost much of its former virulence.

The November rainfall, which is indicated in the third column of Table III., is more often than not altogether negligible in its influence on the wheat crop. Our early varieties are generally ripe towards the middle of November, and never later than the 1st of December, with the result that unless November rain falls in the very first days of the month, when it still has the effect of a late spring fall, it is without appreciable influence on the growth and yield of crops.

In the fourth column of Table III. is indicated what may be termed the total useful rain reaching the wheat crop ; and the mean figures for 27 years show it to be represented in the Roseworthy district by practically 12in., thus leaving about 5½in. that are without any particular influence on the growth of wheat crops.

The last column of the table indicates the rain falling on land that is fallowed for wheat from the time of the breaking of the fallows to seeding operations. This period we have taken to extend between August of one year and April of the year following inclusively. It is of course true that many a piece of early fallowed land will benefit by portion of the July rainfall ; it is, on the other hand, equally true that many fallowed fields will escape the full benefit of August rain. So far as we are at present concerned, the breaking of the of the fallows of the plots of the Permanent Experiment Field is generally completed by early August, and we therefore feel justified in adopting the period as indicated above. It will be noted as a curious coincidence that the average fallow rain—11.30in.—corresponds almost exactly to the average useful crop rain—11.90in. How much of these 11.30in. falling in the season that precedes seeding operations is likely to prove of benefit to the crop of the succeeding year we are not in a position at present to state. We have in hand, however, a series of experiments that may serve to throw some light on this vexed question.

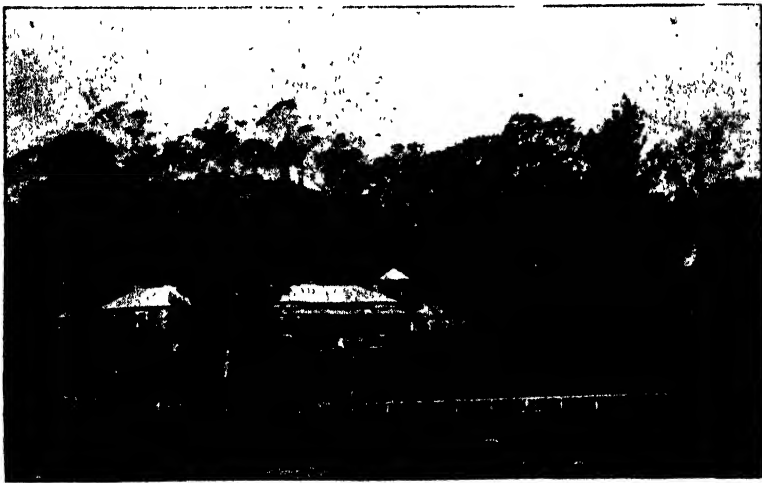
We believe that we have set out fairly clearly the conditions of climate under which we happen to be working. We have also indicated in outline the form of practice that experience has shown to have rendered wheat-growing absolutely safe in the district. We may therefore now pass on to a consideration of the individual yields of the various plots of the Permanent Experiment Field.

THE ROTATION PLOTS.

The objects aimed at in these Rotation Plots have been fully set out in earlier reports ; and, briefly speaking, they may be said to constitute an inquiry as to whether or not local farming is entirely dependent on bare fallowing, as at present practised in the district. Nobody recognises more willingly than we the great benefit to be derived from a year's clean bare fallow before the

wheat crop ; indeed, we are prepared to maintain that under local conditions there exists no other farming practice better calculated to secure to farmers maximum yields. On the other hand, however, paradoxical though it may appear, maximum yields in the main crop, whatever their spectacular advantages, do not necessarily constitute the chief objective of profitable farming. In common with many others we see the time coming when even the highest of yields must fail to compensate us for the loss of a year's use of the land ; indeed, independently of any other factors, high land values alone are competent to bring about such a result. Apart, however, from this important fact, the more general use of live stock on the farm, that has characterised Lower North farming of latter years, must necessarily lead to the introduction of new elements into ordinary farm practice. The direct profit derivable from live stock must depend very largely on the extent to which it is possible to rear and feed them economically ; and this again implies the possibility of raising crops that can be disposed of by live stock at a minimum of cost. And the mere fact of handling relatively new crops introduces a disturbing element in the routine of ordinary farm practice ; for unless the latter can be intelligently connected with the main crop—wheat—in a more or less definite system of rotation avoidable waste and losses must inevitably arise ; hence, we take it, the great advantage of endeavoring to secure early reliable data on the subject.

(To be continued.)



A STATION HOMESTEAD.

AGRICULTURE IN OTHER LANDS.

By Professor PERKINS, Principal of Roseworthy College.

GREAT BRITAIN.

(Continued from the issue of October, 1910.)

AN ENGLISH AGRICULTURAL COLLEGE.

I paid a visit to the Cirencester Royal Agricultural College in June, 1910. At this institution I was received very kindly by the principal and staff and shown over all there was to see. I suppose on such an occasion it is only natural that a comparison with the institution with which I have been connected for close on 20 years should arise in my mind. I feel, however, that criticism on my part would not be justified. The conditions which Cirencester and Roseworthy are respectively meant to meet are so intrinsically different that any comparison between the two would, to my mind, be exceedingly unfair. I shall, therefore, content myself with stating that an institution conducted on the Cirencester lines could not possibly thrive in Australia. The principal pointed out to me that the students were drawn exclusively from those ranks of society who do not need to do manual labor of any kind, and who, in the majority of cases, do not wish to take part in manual labor. It is evident in such circumstances that the training imparted must differ radically from the training imparted at Roseworthy; and the fact that the institution is, as I was informed, very well patronised would appear to suggest that it meets the requirements for which it was brought into existence. Students' fees vary from £130 to £170 per annum, according to the style of residence allotted. These fees, according to the principal, were moderate when compared with average public school fees. One-half of the students, however, are non-resident.

Instruction imparted at Cirencester is almost entirely theoretical. There are only a few acres of land attached to the college, and the bulk of it is taken up with very nicely laid out grounds. Naturally there is but little room on this diminutive area for college-owned live stock. I counted, I believe, 12 head of cattle, 20 to 30 sheep, two or three horses, and a dozen pigs recently purchased in the market for fattening purposes. Farm buildings and workshops are of the most meagre description, although no doubt amply adequate to the calls that may be made upon them.

On the other hand, the college has a right of entry into a neighboring farm for purposes of instruction; for the privilege they pay what may be termed a capitation grant regulated by the number of students in residence. Thus students do not take part in farm work, nor have the college authorities the

advantage of working a farm on the lines that they might recommend to students. The practical training of students, therefore, is restricted to the observation of the success or failure that follows the efforts of a neighboring farmer.

It should be noted that the institution labors under difficulties that are not of its making. It receives no grant-in-aid, and is burdened by a heavy ground rent; hence, any reduction in fees, even if it were desired, would spell ruin, and attempts at improvements involving the outlay of capital must prove exceedingly difficult.

Whilst at the college I was very kindly shown over the farm of Mr. Russel Swanwick, to which have access the staff and students of the college. I wished particularly to see the Berkshire pigs bred on the farm, as several representatives of the herd have found their way into Australia, and some of them are to be found in the pedigree of the Roseworthy College pigs. At Roseworthy, since the introduction of this blood, we have frequently been troubled with white body splashes and otherwise badly marked pigs. I can now understand why this should have been the case. In many respects Mr. Swanwick's herd is a fine one. I noted, however, with surprise that several of the brood sows were badly marked—sows which I should have had no hesitation in sending to the butcher as porkers.

AGRICULTURE AT CAMBRIDGE.

On July 6th I transferred my headquarters to Cambridge, and I may say that I soon found myself in most congenial atmosphere, an atmosphere that has, I believe, been created within recent years by a handful of enthusiastic workers. The Cambridge University has recently taken over a farm to be worked in connection with its agricultural courses, which I think must do much towards heightening their efficacy. The farm is as yet quite new and in the make, and there is little, therefore, that can be said on the subject in the way of criticism. I had occasion here to visit the plots of crossbred wheats that are being raised by Professor Biffen. He is laboring hard after a rust-resistant, strong flour wheat suited to British conditions.

From a perusal of recent Cambridge literature I had come to the conclusion that at Cambridge what is known as the Mendelian theory had become something like an obsession. When in the midst of the keen Cambridge scientific agriculturists I realised that I had not been mistaken. One is apt to find every natural phenomenon explained on the lines of this theory until we may look to it for a solution of the riddle of the universe. Far be it from me to deny to this theory all value; nevertheless, I think that it is being very much ridden to death.

On the Cambridge farm I made the acquaintance of two Merino rams that had come all the way from Australia, and very much fish out of water did they appear. They are being used for certain experiments in crossing on

Mendelian lines ; indeed, I had a look over some of the first crosses out of Shropshire ewes. They were not unlike, on the whole, some of our cross-bred lambs out of Merino ewes by Shropshire rams. Results of scientific interest may perhaps arise out of these experiments ; I doubt, however, their value in actual practice.

Whilst at Cambridge I had the pleasure of meeting Mr. A. Henry, in charge of the University Forest Department. I enjoyed his enthusiasm, and made note of some suggestions of his as to possibly suitable forest trees for South Australia. Among these he mentioned the yellow pine (*Pinus ponderosa*) of the Western United States, which, according to him, is both drought-resistant and adapted to relatively poor soils. Equally suitable, according to Mr. Henry, is a Mexican pine (*Pinus ayacahuite*), *Cupressus arizonica* of Arizona and California, and the Algerian ash (*Fraxinus angustifolia*).

WOBURN EXPERIMENTAL FARM.

From Cambridge, by invitation of Dr. J. A. Voelcker, I was able to run down to Woburn and inspect the experimental work conducted there under the auspices of the Royal Agricultural Society. The field work was exceedingly interesting. I was very much struck by the effects of the continuous use of sulphate of ammonia in light soil of this character. The wheat plots thus treated were absolutely barren, and have been so for some years past ; practically nothing grows there except spurry (*Spergula arvensis*). Dressings of lime appear to have a counteracting influence in sweetening the soil.

I was surprised to note the thickness of the young turnip crops, and learnt that as much as 3lbs. to the acre is considered an average sowing, which is probably three to four times as much as should ultimately be needed. Thick seeding is adopted, I was informed, as a protection against the turnip fly, which is apt to work havoc among the young plants. Turnips are thinned out with a broad hoe about 8in. wide, the fingers never being called into requisition. I admired the practised skill with which the workmen did this deftly and neatly, and without injuring the plants that were retained.

In this district wheat is said to follow mangels with success. This is a sure indication that the latter must ripen very early to give time for suitable preparation of the soil for wheat. There is no doubt that in the majority of cases recently pulled mangels leave the soil far too open and loose for wheat. According to the farm manager at Woburn (Mr. Hogg), seven years' experience has shown wheat not to succeed as well after tares as after mustard and rape. As this is contrary to usually accepted views, I have thought it worth while noting so far as Woburn is concerned.

THE LAKE DISTRICT.

On July 11th I left Cambridge for Westmoreland and the English Lake District, where I remained until the 19th. The sheep of the district are mostly

Herdwick, or, in the richer pasture, half-bred Leicesters. The Herdwicks are most unprepossessing looking animals—small, undersized, pot-bellied, and generally of stunted appearance. I was informed, however, that no other sheep can live in these parts; the winter is too severe for them. It might be suggested that they follow the example of the Greeks and Spaniards, who winter their sheep on the plains, leading them back to the mountains with the return of warm weather.

Mr. Pattinson, who is a member of the governing body, was kind enough to motor me over to Rigg Newton, a farm school kept jointly by the counties of Cumberland and Westmoreland. I was very much impressed with the neat and tidy way in which this little farm is managed. The dairy herd consisted mostly of unregistered Shorthorns. One cow is said to have yielded over 1,000 galls. of milk three years in succession, never testing less than 3 per cent. and often 4 per cent. As an indication of the trend of public opinion I here heard it stated that the Scotch Shorthorns had ruined the dairying industry of Great Britain, which explains the growing popularity of the new milking strains. The flock consisted of various crossbred ewes, mostly Herdwick and Border-Leicesters. They had been put to Down rams for fat lambs.

According to Mr. Lawrence the following is the rotation most in use in the district:—First year, roots (turnips or mangolds); second year, oats; third year, seeds (consisting usually of red clover, alsike clover, rye grass, cocksfoot, and timothy). The seeds are cut once for hay, afterwards grazed; fourth year and sometimes fifth year, grazing; fifth or sixth year, lea oats.

This represents, therefore, a five or six years' rotation according as the sown grasses are grazed one or two years in succession. The bulk of the manuring is placed at the head of the rotation to the root crop.

Mr. Lawrence stated to me that after many years' experiments they had found the following dressing of purely artificial manures to be the most profitable for the turnip crop:—1 cwt. of nitrate of soda, 2 cwts. of kamite, and 5 cwts. of superphosphate to the acre, representing a total cost of 29s. 6d. to the acre. The usual practice of the district, however, consisted in the use of 12 tons of farmyard manure and about quarter of the dressing of artificials indicated above.

On July 19th I set out for Scotland, where I remained until August 9th. Unfortunately it rained almost continuously throughout my stay, and of field work I was able to do very little.

THE DUMFRIES SHOW.

On July 21st I attended the Dumfries Show of the Highland Agricultural Society. I was unfortunately compelled to examine and admire the exhibits from the shelter of my umbrella, with my feet for the most time in a quagmire. Long use of this delightful weather enables the natives to accept the position with philosophy. I am conscious, however, that it may have served to

prejudice me somewhat against the exhibition as a whole. Whatever the case may have been, my general impression was that the Dumfries Show, both in point of numbers, variety, and general excellence of exhibits, fell far short of the Liverpool Show of the Royal Agricultural Society.

After going through the magnificent exhibition of Shorthorns at Liverpool, I was disappointed with this exhibit, particularly as I had been led to expect great things of the Scotch Shorthorns. I did not see a single animal that stood out, except perhaps a young bull that took first for bulls calved in 1909, and appeared to me very promising. I have no fault to find with the Aberdeen-Angus exhibits; as a whole they were excellent, and for the most part in the pink of condition. First and champion bull, $3\frac{1}{2}$ years old, was a magnificent specimen of the breed. I was also highly impressed with some of the heifers that were not, however, very high up in the prize list. There were 13 Aberdeen-Angus exhibits. Some of the Aberdeen-Angus cows had ruddy, if not red, calves at foot.

The Galloways were represented by 57 entries, and constituted a very creditable exhibition. This breed, which is smaller than the preceding one, and with better dairying aptitude, is, I was told, acquiring a good degree of popularity.

The shaggy Highland cattle are, I suppose, more ornamental than useful, although I have no doubt that they could not be replaced with any degree of advantage in the rough country to which they are confined. The 46 entries at Dumfries made a most picturesque exhibit, and indeed I saw several Highland cows with bags that would put to shame many an ordinary dairy cow.

There were 59 Ayrshire entries. As at the Liverpool show, I was impressed with the fact that the bulls appeared to lack masculinity and had an almost steer-like appearance. Does selection in the direction of heavy milk production have this tendency? If so, it is certain that in the end it will prove prejudicial to the breed.

The draught stock was represented by 161 entries, including geldings, all of which I took to be Clydesdales, although it was not expressly so stated in the official catalogue. As at Liverpool, where they were, perhaps, inadequately represented, I was again disappointed in the Clydesdales as a whole. They appear to me to lack in massiveness and compactness, to be loosely built, slack, and even at times, flat-ribbed. If there is nothing better to be seen in Great Britain than what I saw both at Liverpool and Dumfries, I must confess that I shall return to Australia a convert to Shires, although I am inclined to give the preference to the much-improved French Percherons.

Of horses, there were in addition 130 hunters, not of superlative merit, 35 hackneys, 9 ponies, 21 Highland ponies, and 49 Shetland ponies—the latter a most attractive exhibit of its kind.

There were 85 Blackface sheep entries, making a very fine exhibit. As a breed they appeared to me much superior to the Herdwicks, to which the men of Cumberland and Westmoreland appear so attached. The 37 Cheviot entries, with their brilliantly white faces, their erect ears and their hare-like heads, made a very good impression. They also have the appearance of exceedingly fine sheep. Border-Leicesters, represented by 103 entries, were perhaps the finest sheep exhibit on the grounds.

To me the surprise of the show was to find amongst the sheep a special class, labelled simply "Half-bred," including 10th rams and ewes, and which on examination I came to the conclusion to be crosses between Cheviots and Border-Leicesters. What could such a class possibly be doing in an agricultural show? They were admittedly fine, upstanding animals, but why offer prizes for half-bred rams? For what purpose can they possibly be used? Unfortunately I could come across nobody who could enlighten my ignorance.

Down sheep were represented by 8 Shropshire entries, very far from first-class; 10 Oxford entries; and 20 Suffolk, somewhat better.

Of pigs, there were 37 Large White and 17 Berkshires of medium quality.

A VISIT TO IRELAND.

August 10th to 16th was taken up in a hurried visit to Ireland, during the course of which I collected no agricultural news. If one were to judge from what can be seen from a railway carriage, Ireland has from an agricultural point of view, a very neglected appearance, in striking contrast to the well-tilled fields of Scotland and England. Ditches everywhere, overgrown, unkempt hedges dividing up the country into the smallest of fields; but the geniality, the cordiality of the people high and low, cannot be equalled anywhere. Why wear yourself out in toil when all's well in the best of all possible worlds? Nowhere have I seen horses better tended, better groomed, than in Ireland. There appears to be no doubt that the Irishman loves his horse; indeed, as I found later on, Irish horses have acquired quite a reputation on the Continent in general. On several occasions and in various countries I have heard a typically well-bred horse referred to as equal to a thoroughbred Irish horse.

Whilst in the neighborhood of Killarney I had occasion to admire some very fine types of Dexter dairy cattle. I am persuaded that we have here a breed that might with advantage be used more extensively in Australia, at all events in those portions of it blessed with a fair rainfall.

I wish here to place on record my great indebtedness to the Agent-General and his office. To Mr. Whiting in particular I am under a personal debt of gratitude. There appeared to be nothing that he was not prepared to do for a stranger.

EGG-LAYING COMPETITIONS, 1910-11.

By D. F. LAURIE, Poultry Expert.

ROSEWORTHY COMPETITION.

The test was divided into two sections. Section No. I.—Light breeds—Fifty-eight pens of White Leghorns, one pen of Black Minorcas, two pens of Brown Leghorns were entered. Section II.—Heavy breeds—This section was made up of 14 pens of Black Orpingtons, eight pens of Silver Wyandottes, four pens of Langshans, and two pens of Buff Orpingtons.

SUMMARY OF RESULTS.

Number of pens	89
“ birds	534
Total number of eggs laid	102,723
“ value of eggs laid	£358 17s. 8-9d.
“ cost of feeding	£157 4s. 2d.
Profit over feeding	£201 13s. 6d. •
Average market price of eggs	11-2d.
“ number of eggs laid per pen	1,154-2
“ “ “ hen	192-3
“ cost per pen in competition	£1 15s. 3-9d.
“ “ hen “	5s. 10-65d.
Profit per pen over cost of feeding	£2 5s. 3-8d.
“ hen “ “	7s. 6½d.
Eggs laid by winning pen, Section I.	1,513
“ “ “ “ II.	1,231
Highest monthly score, Section I.	163
“ “ “ “ II.	155
Highest weekly score, Section I.	41
“ “ “ “ II.	41

SECTION I. (LIGHT BREEDS).

The leading pen, owned by Mr. A. H. Padman, laid 1,513 eggs, which, while not equal to the results obtained with two previous tests, is nevertheless highly satisfactory, an average of 252-1 eggs per year per hen. If we contrast this with the return of the lowest yield obtained in the section it will easily be admitted that it pays to breed and keep good layers only. What is a most gratifying feature of this test is the general average production per hen for the year, viz., 205-2 eggs. This result is gained from the flock of 348 White Leghorns. A higher average has been made in an Australian com-

petition, in which only a handful of fowls were competing. This extensive test is of commercial value, and the results may be claimed as unique in the annals of poultry-breeding. The prizewinners are as follows :—

SECTION I. (LIGHT BREEDS).

		Value of Eggs Laid.		
		£	s.	d.
1st.	A. H. Padman, Hyde Park	5	7	11-65
2nd.	W. Purvis, West Glanville	5	4	10-61
3rd.	Moritz Bros., Kalangadoo	5	4	1-58
4th.	J. George, Queenstown	5	3	5-50
5th.	Mrs. A. E. Kinnear, Hyde Park	5	2	3-00

SECTION II.—HEAVY BREEDS.

The variety was limited to 14 pens of Black, two pens of Buff Orpingtons, eight pens of Silver Wyandottes, and four pens of Langshans. The winners in this section are as follows :—

		Value of Eggs Laid.		
		£	s.	d.
1st.	Cowan Bros., Burwood, N.S.W.	4	6	2-46
2nd.	Kappler Bros.' pen 88, Marion	4	4	0-68
3rd.	J. E. Padman, Plympton	4	3	4
4th.	C. B. Bertelsmeier, Clare	4	3	1-72
5th.	Kappler Bros.' pen 90, Marion.....	4	2	0-14

SPECIAL PRIZES FOR HEAVIEST EGGS.

For years eggs were bought and sold in this State without due regard to size; grading was unknown to the trade, and yet is an old-established, important custom in other countries. To encourage the production of marketable eggs of a fair size a regulation was made, stating that those pens the eggs from which did not attain the average weight of 2½ozs. to the dozen on July 31st, 1911, should be ineligible to win a prize. There were 61 pens in Section I., and it is pleasing to record that no pen failed in this respect. In Section II., however, out of 28 pens there were found six pens the eggs from which did not come up to the required weight. To encourage breeders, special prizes were offered as follows :—For the heaviest total yield of eggs laid. (Pens must lay 1,000 eggs to qualify.) The winners are—

	Name.	No. of Eggs	Weight. lbs.
1st.	£5—Moritz Bros.....	1,455	2,455-2
2nd.	£2—A. H. Padman.....	1,513	2,387

To further encourage the production of breeds or strains laying very large eggs, prizes were offered without limitation as to number. The winners are—

	Name.	Average Weight of Eggs.
1st.	£2 10s.—J. E. Rice (White Leghorn)	28½ozs.
2nd.	£1 10s.—Mrs. Ladyman Smith (Minorca) and G. Toseland (Langshan), equal)	27½ozs.

MONTHLY PRIZES.

Prizes to the value of 10s. in each section were offered each month for the highest value of eggs laid by a pen of fowls. The following tables show names of winners each month in each section.

Section I.—Roseworthy.

Month	Value.		No of Eggs Laid.	No. of Pen.	Breed.	Owner.
1910.	<i>s.</i>	<i>d.</i>				
April	13	3-55	126	52	White Leghorn	A. H. Padman
May	17	0-48	144	15	"	W. Purvis
June	13	6-09	126	15	"	"
July	11	1-48	131	14	"	H. Stevenson
August ..	9	5-26	156	26	"	Gerald FitzGerald
September	6	1-38	157	26	"	"
October ..	7	10-84	163	52	"	A. H. Padman
November	8	0-24	163	52	"	"
December	9	0-11	1-7	52	"	"
1911.						
January..	7	8-93	140	52	"	"
February.	9	0-19	117	52	"	"
March ..	10	5-77	112	6	"	C. Hutton

Section II.—Roseworthy.

Month.	Value.		No. of Eggs Laid.	No. of Pen.	Breed.	Owner.
1910.	<i>s.</i>	<i>d.</i>				
April	11	3-52	107	77	Black Orpington	J. F. Padman
May	12	0-46	101	80	"	"
June	13	9-55	1-8	66	"	Cowan Bros.
July	11	5-11	135	86	Silver Wyandotte	D. W. Bartlett
August ..	9	0-30	149	79	Black Orpington	Francis Bros.
September	8	0-22	155	75	"	W. E. Palmer
October ..	7	3-22	150	66	"	Cowan Bros.
November	6	1-24	125	68	"	C. B. Bertelsmeier
December	7	0-38	123	66	"	Cowan Bros.
1911.						
January..	5	6-60	100	79	"	Francis Bros.
February.	6	10-38	90	93	Langshan	H. D. Jonas
March ..	8	6-82	92	79	Black Orpington	Francis Bros.

BREEDS AND AVERAGES.

The following table will show the position of the various breeds at the end of the test, also the average of each breed competing :—

No. of Pens.	No. of Birds.	Breeds.	Totals.	Average per Pen.	Average per Hen.
58	348	White Leghorn	71,434	1,231-62	205-27
14	84	Black Orpington	14,736	1,052-5	175-41
2	12	Brown Leghorn	2,063	1,031-5	171-91
8	48	Silver Wyandotte	8,086	1,010-75	168-45
1	6	Black Minorca	1,087	1,087	161-16
2	12	Buff Orpington	1,884	942	157
4	24	Langshan	3,433	858-25	143-04

KYBYBOLITE COMPETITION.

On the whole I am satisfied with the results which have been obtained on land of which there is none less suitable to poultry in the South-East. The work of this station will show that even in such unfavored localities poultry and egg production returns a good profit. I am forced to add a reminder to those who find the conditions of life on such land somewhat disappointing financially, that if they devoted more time and attention to poultry their pockets would benefit. It is not to be expected that on such land, and in a cold damp climate (in the winter), that fowls will lay as heavily as at Roseworthy. There is, however, every reason for believing that in time it will be found that locally-bred poultry will suit the conditions.

PRIZEWINNERS AND NUMBER AND VALUE OF EGGS LAID.

The following table shows the names of prizewinners and number and value of eggs laid by the hens during the year. The prizes are based on the market value of the eggs—not upon the number laid :—

Section I.

	Owner.	No. of Eggs Laid.	Value of Eggs Laid.		
			£	s.	d.
1st.	£7 10s.—Moritz Bros.	1,195	4	5	8-22
2nd.	£3—"Eurinima"	1,044	3	13	2-98
3rd.	£2—G. Mohr	1,035	3	12	7-49
4th.	£1—J. Jarrad	994	3	10	0-96
5th.	10s.—Sudholtz Bros.	985	3	9	11-40

Section II.

	Owner.	No. of Eggs Laid.	Value of Eggs Laid.		
			£	s.	d.
1st.	£7—A. H. Padman	1,151	4	3	8-45
2nd.	£5—Mrs. A. E. Kinnear	1,110	3	14	10-80
3rd.	£2—W. Purvis	1,051	3	12	4-87

WEIGHT IN EGGS.

To encourage the production of good average-sized eggs for market purposes prizes were offered for the heaviest eggs, and also for the pen laying the heaviest total yield of eggs; 1,000 eggs was the number fixed upon to qualify for this prize. The results are as follows:—

HEAVIEST TOTAL YIELD OF EGGS.

		Weight of Eggs.	
		lbs	
1st.	£3—Moritz Bros.	1,867	
2nd.	£1—"Eurinima"	1,566	

HEAVIEST EGGS.

		Weight of Eggs per Dozen.	
		ozs.	
1st.	£2—O. S. Debney	26	
2nd.	£1—Moritz Bros.	25	

MONTHLY PRIZES.
Section I.—Kybybolite.

Month.	Value.	No. of Eggs Laid.	No. of Pen.	Breed.	Owner.
1910.	s. d.				
April	8 4.33	78	2	White Leghorn	Moritz Bros.
May	13 10.40	117	10	"	F. A. Holmes
June	10 4.34	97	3	"	Sudholz Bros.
July	6 4.49	77	3	"	"
August ..	5 0.16	85	6	"	James Jarrad
September	5 2.26	100	2	"	Moritz Bros.
October ..	6 2.92	129	7	"	G. Mohr
November	6 5.78	132	2	"	Moritz Bros.
December.	7 8.09	154	2	"	"
1911.					
January..	7 7.49	137	11	"	"Eurinima"
February.	3 2.53	107	2	"	Moritz Bros.
March ..	8 3.05	90	2	"	"

Section II.—Kybybolite.

Month.	Value.	No. of Eggs Laid.	No. of Pen.	Breed.	Owner.
1910.	s. d.				
April	7 11.95	76	27	White Leghorn	Mrs. A. E. Kinnear
May	12 7.22	106	26	"	A. H. Padman
June	9 5.50	87	28	"	R. G. Lillywhite
July	5 0.22	60	44	Buff Orping'on	W. Palmer
August ..	5 8.53	97	27	White Leghorn	Mrs. A. E. Kinnear
September	5 7.08	108	27	"	"
October ..	6 2.90	129	27	"	"
November	6 5.64	131	26	"	A. H. Padman
December	8 1.68	142	26	"	"
1911.					
January..	7 6.55	135	30	"	W. Purvis
February.	7 8.99	101	26	"	A. H. Padman
March ..	9 7.29	104	26	"	"

KYBYBOLITE—SUMMARY RESULTS.

Number of pens.....	40
Number of birds.....	240
Total number of eggs laid	35,065
“ value of eggs laid	£118 4s. 4-34
“ cost of feeding	£67 8s. 9½d.
Profit over feeding	£50 15s. 6-84d.
Average market price of eggs	11-2d.
“ Number of eggs laid per pen.....	876-6
“ “ “ “ “ hen	146-1
“ cost per pen in competition.....	£1 13s. 8-4d.
“ “ “ “ “ hen	5s. 7-4d.
Profit per pen over cost of feeding	£1 5s. 5d.
“ “ “ “ “ hen	4s. 3d.
Eggs laid by winning pen in Section I	1,195
“ “ “ “ “ II.....	1,151
Highest monthly score, Section I.....	134
“ “ “ “ “ II.....	142
Highest weekly score, Section I.....	34
“ “ “ “ “ II.....	37

PICKLING OLIVES.

EUROPEAN METHODS.

In a country like South Australia, where the olive grows to perfection, regret has often been expressed that so little use is made of the pickled fruit, which is so largely consumed by all classes in the south of Europe. When this after-dinner delicacy is purchased in Adelaide, the label usually shows that the olives were grown in Spain and bottled in London. This is a round-about route for the article to reach the Australian consumer, especially when we remember that olives are growing all round us, although they may not be so large or suited for the table as the "Queen Olive" of Spain. Recently the Adelaide Chamber of Manufactures asked the Government for reports on Continental methods of pickling. The Agent-General communicated with the Foreign Office, and valuable reports were contributed by the British Ambassadors at Paris and Madrid, the information being for the most part supplied by the Chamber of Commerce of Nice and the Algerian Government.

SPANISH METHODS.

The olives are first selected and placed in a vat. If the quantity is large, a solution of caustic soda is generally used for pickling, as by this means the process is accelerated and fewer vats are necessary. The olives are allowed to stand in the caustic soda from three to four hours, after which they are placed in water. The water is changed from time to time till the olives are sweet. They are finally placed in brine. When time is no object a strong lye of wood ashes may be substituted for the caustic soda, and the olives left in it for 24 hours. Aromatic herbs, such as thyme, fennel, laurel, &c., are frequently added to the olives when they are placed in brine.

The less bitter varieties of olives do not require treatment with an alkali, and are put direct into a strong brine or merely soaked in water as a preliminary treatment. The procedure in this case is as follows:—A few olive branches are placed at the bottom of the vat, and on top of these are placed the olives. When the vat is nearly full a few more olive branches are laid over the top and the whole is secured by boards, which are tied down. Brine containing sufficient salt to float a hen's egg is then poured into the vat so as to well cover the olives. If desired, aromatic herbs may be added before the brine is poured in.

In Seville (south of Spain) the olives used for table purposes belong to the varieties Gordal, Reina, Manzanilla, Padronac. The green olives are placed in a lye made of commercial caustic soda of a density of from 2° to 2½° Baume (approximately). They are covered with a mat to keep them immersed. Generally they are kept in the liquid for 11 hours, but some factories keep them there for 14 hours; it all depends on the variety and the degree of maturity of the fruit. They are then rinsed in limpid running water, in which they are left for 10 hours. They are finally put into a brine of table salt of a density of 11° Baume, in which they remain for a month.

NICEAN METHODS.

At Nice (south of France) green olives are preserved in the following way:—Pick them at the end of November (May in Australia), not before; do not take any but absolutely sound fruit, hand grade them, and reject all damaged ones. Place in a receptacle filled with pure water, and change this every day for three weeks. Then put them in receptacle (barrel, glass vessel, or jar) and cover with brine containing 250 grammes of salt per litre of water (40ozs. per gallon). The brine prepared cold is the best. It is made by preparing a saturated solution of salt in water, using the fluid only and rejecting the undissolved salt. This process takes two or three days. Olives so picked are eatable in two or three months. They improve by keeping, and keep good for two years.

Black olives are prepared in the same way, care being taken not to use any but sound fruit. Pick February 15th (August) to March 15th (September). Steep for 12 to 15 days instead of three weeks, in ordinary water. The olives are fit for eating in about 40 days and keep for from 12 to 18 months. Aromatic herbs (laurel, sage, thyme, rosemary, pepper, &c.) are sometimes added, but some of the best authorities consider that they spoil the natural flavor of the olives and are undesirable.

ITALIAN METHODS.

At present the industry flourishes in Greece, Tunis, France, Portugal, and California, but is decadent in Italy, where the export of green olives is confined to the district of Ascolano. In the olive-growing districts the produce is consumed locally. The most esteemed table varieties are, according to Signor d'Ayala, Professor of Agriculture, the "Bellu" and the "Grossa di Spagna," which weigh 10 grammes (5½drams) each, and are grown in the province of Lecce; the Ascolano, which weighs 6½ grammes; the "Limoncella," etc.

Green Olives.—In order to eliminate the acid and astringent principles, recourse is had to a sweetening process by means of pure water, which is to be changed every four of five days. The process takes from one to two months, and the olives may easily be spoiled during this time. To assure

success and preserve the green color of the fruit, care has to be taken to pick the olives at the right time and handle them carefully. The olivegrowers of Ascolano even recommend that the fruit be not touched with the bare hands

Instead of pure water it may be better to use a mixture composed of three to four parts of sifted ashes and one part of quicklime, in which the olives are kept 12 hours to 15 hours. The best lye to employ is the one prepared according to the method in use at Ascolano. Four parts of sifted ashes and one part of hydraulic lime are well mixed and the mixture poured into a wooden cask, into which a layer of straw has been previously placed. At the bottom of the cask is an outlet closed with a bung. The water is poured in from the top and the lye drawn off at the bottom. The density is ascertained with the Baume arcometer, and should be 7° to 8°. If necessary, water is added to reduce it to that density. The olives are then placed in the liquor and kept immersed by means of a cover. Sweetening is completed in from five hours to ten hours, according to the variety and the degree of maturity of the fruit. In order to test if the process is finished, an olive is well rinsed and dissected right down to the stone. If the color be a pale yellow the sweetening process has been successful.

The liquid is drawn off and fresh water poured over the olives to remove the taste of the lye. They are then put into 4 per cent. to 6 per cent. common salt solution in a glazed receptacle, fennel and laurel leaves being added. Instead of preserving the sweetened olives in brine they may also be preserved in oil. Stuffed olives are produced by removing the stones and putting anchovy paste or capers in their place.

Black olives may be cured in brine or by desiccation. In the former case the fruit must be ripe (not over-ripe), which means to say that the flesh must be firm without being astringent. After putting them for four to five days in pure water they are placed in a 4 per cent. to 6 per cent. solution of salt, and fennel or laurel are added.

Dried black olives are prepared in various ways. They are, for example, placed in baskets and covered with a layer of salt. The fluid that is formed is allowed to drain off. They are then kept on trays for from five days to six days, or until they are sufficiently dry. The olives for desiccation in the open air have to be very ripe, and the desired degree of desiccation will be obtained in a few days. To prevent mouldiness they are salted or kept in oil. The black olives may be dried in a baker's oven at a temperature of 40° Cent. (104° Fahr.), then salted and put in oil. This latter method is practised in Greece and Southern Italy.

The industry is a very remunerative one, as the following figures will show:—One quintal (nearly 2cwts.) of preserved olives at 1'50fr. per kilo = 150frs. gross (£6). Deducting 40frs. for incidentals leaves a net value of 110frs. (£4 8s.).

In some of the communes of the province of Bari (Southern Italy) recourse is had to the following process for the preparation of green table olives :— To 100 kilos (1·968cwts.) of olives they take $76\frac{1}{2}$ kilos (168lbs.) of unleached ashes and 5 kilos (11lbs.) of lime ; sufficient water is added to make a thin paste. Into this lye, which is to be kept in a wooden or glazed earthenware receptacle, the olives are plunged for the purpose of sweetening them.

They have to be kept well immersed, and after half an hour the mass is stirred with a wooden spoon. This is repeated two or three times at regular intervals. From time to time olives are taken from different parts of the mass to ascertain how far they have been browned by the caustic properties of the lye. If they are meant for immediate consumption, half the thickness of the flesh should be browned, but if they are meant for keeping, quarter of the thickness only. They are then removed from the lye and placed into a receptacle containing pure fresh water. They are rinsed by changing the water two or three times a day until it comes away clean (uncolored). The well-rinsed olives are then put into clay vessels, which are varnished inside. and a brine is poured over them which is obtained by dissolving $6\frac{3}{4}$ kilos (15lbs.) of common salt in 60 litres (13galls.) of water. The olives are kept completely immersed in brine, and if there should not be enough of it more water is added. At the top of the receptacle containing the olives a bunch of wild fennel is placed for the purpose of giving them the aroma which is so much appreciated by the consumers. In about a month's time the brine is changed, and this is repeated every other month. By this means the olives can be kept a long time. Before serving the olives at table they are generally soaked in fresh water for some hours to deprive them of the excess of salt.

Black olives in the province of Bari are gathered after they are somewhat shrivelled, and are washed in tepid soft water. They are spread on trays in the open air for from eight to ten days, and then covered with a layer of salt (5 kilos of salt to 100 kilos of olives). This is done in clay vessels varnished inside. When it is noticed that the salt over the olives is dissolved, which takes place in about seven or eight days, the olives are mixed by pouring them from one dish into another. This is done from day to day until the olives have ceased to absorb the liquid which forms at the bottom of the receptacles. The olives are dried on trays. They are then replaced in the former receptacles, and are fit for eating. Some wash the olives with white wine before drying them.

DRIED APRICOTS.

A PROMISING MARKET IN ENGLAND.

By the TRADE COMMISSIONER (MAJOR NORTON, D.S.O.).

In a report of last year I criticised the action of South Australian fruit-growers who had grubbed up their apricot trees as unprofitable, because I maintained that the markets in the United Kingdom and Europe had never been properly exploited. Since then I have made still further investigations, and as a result am more than ever convinced that my assertion is right. I have spoken to numerous large retailers, both at their own establishments and at exhibitions where we have been showing.

At a recent cookery exhibition I took the opportunity of having a chat with the chief instructress, and she stated that she could not understand why those interested in the trade did not follow the example of the Greek Government and spend some money in educating the public how to cook dried apricots. She said there was not one woman in a thousand in England who knew anything about the value of dried apricots. In her opinion if the housewife thoroughly understood how to prepare the fruit the demand would enormously increase. She further stated that, altogether apart from stewing purposes, she had made jam from dried apricots equal to any she had ever made from fresh fruit. This latter fact is of the utmost importance because if there is one thing more than another the women of what are known as the "middle class" in England pride themselves on it is the fact that they always make their own jam. This is particularly so in Yorkshire and the North of England generally. In England, during the summer, fruits such as plums, red and black currants, raspberries, strawberries, cherries, and apples are always to be bought at prices within the reach of the average housewife, and accordingly she is able to make these varieties of jam. It is not so with apricots—the price of fresh apricots suitable for jam-making is beyond her limit. There certainly is cheap so-called apricot jam retailed in England, but that is not purchased by the class of people I am referring to. Apricot jam manufactured by well-known firms is comparatively dear (6d. per pound) and looked upon as a luxury. One pound of dried apricots will make 4lbs. of jam, at a cost of 4d. per pound—

1lb. finest dried apricots at 11d.....	11d.
2lbs. best sugar at 2½d.	5d.

1s. 4d.

I venture to assert that if it was generally known that absolutely pure apricot jam of the finest quality and color could be made at the above-mentioned cost every housewife of the class mentioned would include apricot jam in her list of home-made jams.

Another important feature: When the public understand how to serve this fruit as a dessert it will to a great extent take the place of the canned and bottled article—a most important item so far as Australia is concerned. Manufacturers in Australia complain that they cannot compete with the foreigner on the English market, owing to the high price obtaining for labor, tins, bottles, &c., in Australia as against what the foreigner has to pay. The trade in England, as I explained in a previous report, is more and more demanding bottled fruits, owing to the prejudice against tins. To meet this demand packers import the fruit in tins and bottle it in England, in accordance with the old saying, "What the eye does not see the heart does not grieve over." In this trade apparently Australia cannot hope to compete. Once, however, the housewife has been educated to prepare dried fruit, the price, which at all times will be in favor of the latter, will be bound to tell; to say nothing of the fact that they will know they are eating pure fruit and wholesome syrup.

Under existing conditions it is quite obvious that neither the Government nor producers would be well advised to spend a great amount of money at the moment, because the Commonwealth demand exceeds the very limited supply, and accordingly oversea markets are unnecessary. My object in following this matter up is with a view to the future. Every year fresh land is being opened up for cultivation of some kind or another, and it often happens that the settler is undecided what to plant. I have no hesitation in recommending that attention be at once again turned to apricots. As I have already stated, the markets at the moment are capable of great expansion, and I believe even more so in the future. Each year America and Canada are consuming more and more of their local products, particularly in the fruit line. Germany is another country where the imports of food-stuffs generally are increasing by leaps and bounds. My recommendations are briefly these—

1. That wherever the land is suitable fruitgrowers should plant a proportion of apricot trees of the right variety.

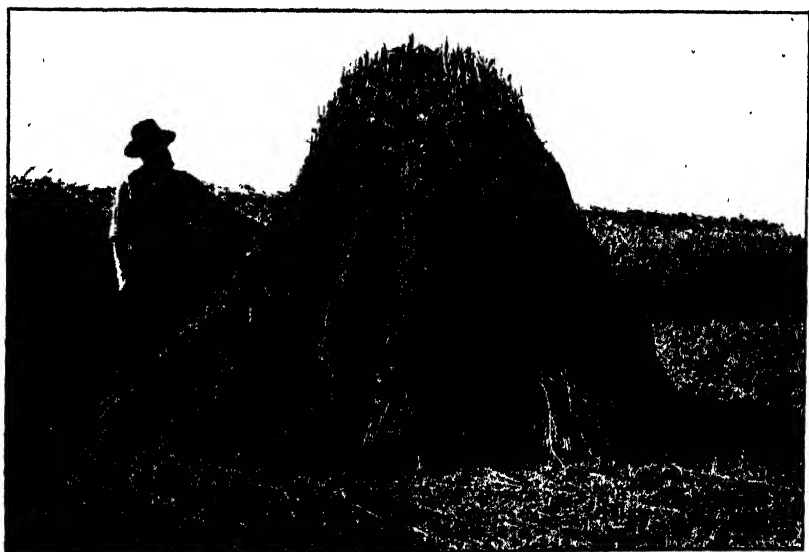
2. That until the production has increased to the point when oversea export is necessary the Government should continue the present method of keeping the industry before the British public.

3. That when the time arrives when oversea export becomes necessary the whole of the producers should contribute an amount in proportion to the quantity they produce; that an equal amount should be contributed by Government, and that the whole be spent in educating the people in the United Kingdom to the uses dried fruits may be put to.

In support of the latter recommendation I would quote from the *Grocers' Review* :—

The South Australian Government have one of the principal and most interesting features in the hall. On the stand is a comprehensive display of the various products of fertile South Australia, and Major Norton is to be congratulated upon his efforts to bring the produce of this part of our Empire to the notice of the British distributors and consumers. As in other things, the public require educating, and if the South Australian Government would adopt a policy such as has been adopted in regard to currants, and apply it to the teaching of the public to improve the cooking of dried apricots, peaches, and other fruits, a great amount of benefit would be derived therefrom.

This is one of the leading trade papers in the United Kingdom. A review of the result of what the Greek and Brazilian Governments have done in regard to currants and coffee will, I think, show that something on the lines of my recommendations should be carried out by South Australia if the necessary markets are to be obtained for our fruits.



THE WHEAT MARKET.

The local price of wheat showed a slight advance during April, in sympathy with a corresponding rise in the London market. In Europe the tone of operations has been quiet, and markets rather stagnant on account of the large stocks arriving and the probability that the coming harvest in the Northern Hemisphere will be satisfactory.

On March 31st *Beerbohm's Evening Corn Trade List* has the following :—
“ Trade has been exceedingly quiet during the past few days, and the undertone of the market weaker than for some time past ; holders have accepted 6d. to 9d. less money for practically all descriptions of wheat, but buyers have shown very little interest even at the decline. It is claimed that, as a whole, reserves of native wheat in importing countries are smaller than usual, and consequently that the requirements of foreign wheat will be very large until the next crops are available, say, in about four months' time. This, no doubt, is correct ; but in France and Italy stocks of foreign wheat are liberal, and consumers generally are under the impression that no difficulty will be experienced in satisfying these large wants, and do not at present show any disposition to depart from their cautious policy of the last few months. In view of the fact that, on the whole, agricultural conditions in most parts of the world have been quite favorable since the beginning of the year, it would not be at all surprising if presently climatic conditions and crop reports become less favorable ; but it appears to be the general opinion that, unless some *serious* damage be done to one or more of the important winter wheat crops, there is little chance for prices to improve.”

On April 7th the same paper stated—“ The final official report on the last Russian crop estimates the spring wheat at over 69,000,000qrs., making the total crop (spring and winter) about as large as that of 1909 ; consequently there must still be very large reserves left in the interior, and there is, therefore, every probability of Russia continuing to export very freely right up to the end of the season. With every prospect of India, the Argentine, and Australia also shipping large quantities, the weekly total promises to be quite liberal.”

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
April 8	Steady; Liverpool dull	3/2	3/4	3/3
10	—	Do.	Do.	3/3 to 3/4
11	Firmer; March-April, 4/11	3/3	Do.	—
12	March-April (Liverpool), 4/21	3/4	3/4 to 3/5	3/3
13	Quiet; Liverpool easier	3/3	Do.	Do.
14	—	Do.	—	—
15	Steady	Do.	—	—
17	—	Do.	3/4 to 3/5	3/2 to 3/3
18	Firm	Do.	—	Do.
19	Steady, but quiet	Do.	3/4 to 3/5	—
20	February-March, 4/23	3/4	3/5 to 3/5 1/2	3/2 to 3/3
21	Off coast, 4/3	Do.	3/6	3/3 1/2
22	Very firm; off coast, 4/3 1/2	3/4 1/2	—	—
24	Further advance asked	Do.	—	—
25	—	Do.	3/6 to 3/6 1/2	3/4 to 3/4 1/2
26	Easier; off coast, 4/3 1/2	3/3 1/2	3/5 1/2 to 3/6	3/4 1/2
27	Quiet; 4/3 1/2	Do.	3/5 to 3/5 1/2	3/5 1/2
28	April-May, 4/3 1/2	Do.	3/5 1/2	3/4 1/2
29	February-March, 4/3 1/2	3/4 1/2	—	—
May 1	—	Do.	3/4 to 3/5	3/4 to 3/6
2	Firm	Do.	Do.	3/4 1/2 to 3/5 1/2
3	May-June, 4/3 1/2; March-April, 4/4 1/2	Do.	3/6	3/4 1/2 to 3/5
4	March-April, 4/4 1/2 to arrive; Liverpool, 4/4 1/2	3/5 1/2	3/7	—
5	April-May, 4/4 1/2; February-March, 4/4 1/2	Do.	3/6 1/2	3/5 1/2
6	Afloat, 4/4 1/2; May-June, 4/4 1/2	3/6	—	3/6
9	Quiet; Liverpool easier	Do.	3/7 to 3/7 1/2	3/5 1/2

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom, Continent, full cargo rates 25s. per ton (8d. per bush.). Parcels, Port Adelaide to London, Liverpool or Continent, 23s. 6d. per ton (7 1/2d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2 1/2d. per bush.); to Sydney, 10s. 6d. per ton (3 1/2d. per bush.).

SALT-SEA FREIGHTS.—From South Australia to United Kingdom-Continent, 23s. 6d. to 24s. per ton (7 1/2d. per bush.); to South Africa, 19s. to 20s. per ton (6 1/2d. to 6 3/4d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for April, 1911, at the undermentioned stations, also the average total rainfall for the first four months in the year, and the total for the four months of 1911 and 1910 respectively :—

Station.	For April, 1911.	A'v'ge. to end April.	To end April, 1911.	To end April, 1910.	Station.	For April, 1911.	A'v'ge. to end April.	To end April, 1911.	To end April, 1910.
Adelaide	0.31	4.37	2.66	4.24	Hamley Bridge	0.28	4.04	2.84	5.22
Hawker	—	2.64	1.35	3.99	Kapunda	0.40	4.36	3.81	5.56
Cradock	—	2.71	1.01	3.96	Froeling	0.25	4.05	3.90	5.82
Wilson	—	2.82	0.62	4.82	Stockwell ...	0.37	4.42	4.15	4.57
Gordon	—	5.76	1.42	2.78	Nuriootpa ...	0.43	4.52	2.97	4.94
Quorn	—	2.85	1.06	2.76	Angaston ...	0.63	4.43	4.36	5.43
Port Augusta	—	2.64	1.48	2.58	Tanunda	0.74	4.69	4.86	4.14
Port Germein	—	3.21	2.79	3.84	Lyndoch ...	0.50	4.64	2.72	3.96
Port Pirie ...	—	3.29	3.19	5.26	Mallala	0.13	4.02	2.05	4.19
Crystal Brook	0.10	3.43	3.02	4.41	Roseworthy .	0.17	4.07	2.50	6.06
Pt. Broughton	0.10	3.41	2.92	3.24	Gawler	0.49	4.28	2.77	4.47
Bute	0.09	3.41	4.11	3.40	Smithfield ..	0.42	3.80	2.98	5.34
Hammond ..	—	2.88	3.48	4.11	Two Wells ...	0.16	3.94	1.84	3.58
Bruce	—	2.17	0.84	2.97	Virginia	0.28	4.03	2.21	4.20
Wilmington .	0.05	3.68	4.09	5.85	Salisbury ...	0.16	4.25	3.73	4.87
Melrose	0.02	4.98	4.61	9.52	Teatree Gully	0.49	6.27	3.20	4.79
Booleroo Cntr	0.01	3.47	1.60	4.97	Magill	0.55	5.56	3.45	3.82
Wirrabara ...	—	3.91	2.21	7.25	Mitcham ...	0.80	4.89	3.86	3.91
Appila	0.02	3.56	2.05	7.86	Crafers	1.58	8.80	6.48	8.19
Laura	0.01	3.83	2.82	7.26	Clarendon ...	0.97	0.86	5.21	4.69
Caltowie	0.05	3.70	2.82	5.48	Morphett Vale	0.41	5.18	3.93	3.77
Jamestown ...	0.09	3.65	3.16	3.42	Noarlunga ...	0.10	4.38	3.94	2.80
Gladstone ..	0.03	3.51	3.15	4.71	Willunga ...	0.65	4.92	4.70	4.56
Georgetown .	0.23	4.06	3.24	3.57	Aldinga	0.35	4.64	2.65	2.82
Narridy	0.18	3.88	2.79	3.27	Normanville.	0.49	4.06	3.58	3.93
Redhill	0.29	3.57	2.64	4.25	Yankalilla ...	0.61	4.71	3.49	6.40
Koolunga ...	0.21	3.61	2.71	4.33	Eudunda	0.41	3.59	3.71	8.14
Carrieton ...	—	2.71	0.78	7.07	Sutherlands .	0.10	—	1.76	4.73
Eurelia	—	2.95	1.67	5.59	Truro	0.45	4.09	3.90	4.40
Johnsburg ..	—	2.14	1.07	4.85	Palmer	0.19	—	3.42	5.42
Orroroo	—	3.47	0.93	4.96	Mt. Pleasant.	0.53	5.16	4.08	4.88
Black Rock ..	—	3.10	1.19	5.80	Blumberg ...	0.66	5.78	4.31	5.22
Petersburg ..	—	3.22	1.97	4.07	Gumeracha ...	0.98	5.99	5.23	5.54
Yongala	—	3.14	1.95	4.48	Lobethal	1.03	6.27	4.08	5.56
Terowie	0.02	3.17	2.79	7.89	Woodside ...	0.69	5.57	4.09	6.86
Yarcowie ...	—	3.19	2.62	6.80	Hahndorf ...	1.36	6.29	6.14	7.92
Hallett	0.09	3.45	2.86	4.37	Nairne	0.73	5.69	6.38	8.92
Mount Bryan	0.06	3.01	2.72	5.27	Mt. Barker ...	0.76	5.70	4.95	8.49
Burra	0.10	3.72	3.59	6.51	Echunga ...	0.99	6.15	5.37	9.80
Snowtown ...	0.01	3.46	2.36	4.05	Macclesfield .	0.64	5.74	4.97	9.83
Brinkworth ...	0.10	3.15	2.99	5.06	Meadows ...	0.87	7.07	6.31	9.20
Blyth	0.11	3.75	2.74	3.59	Strathalbyn .	0.37	3.93	3.86	7.35
Clare	0.44	5.00	3.89	6.68	Callington ...	0.06	3.70	2.75	5.69
Mintaro Cntrl.	0.19	4.14	4.00	6.72	Langhorne's B	0.22	3.56	2.39	4.62
Watervale ...	0.49	5.54	5.44	7.06	Milang	0.07	3.83	1.76	3.24
Auburn	0.47	5.08	4.49	7.39	Wallaroo ...	0.18	3.23	2.48	2.02
Manoora	0.25	3.75	2.69	6.38	Kadina	0.07	3.71	2.55	1.91
Hoyleton	0.30	4.27	4.42	3.67	Moonta	0.14	3.56	3.03	1.79
Balaklava ...	0.18	3.90	3.95	3.93	Green's Plns.	0.03	3.26	2.34	2.34
Pt. Wakefield	0.15	3.57	6.05	3.07	Maitland ...	0.34	4.05	4.47	2.42
Saddleworth.	0.22	4.53	2.53	6.39	Ardrossan ...	0.12	3.08	2.51	2.10
Marrabel	0.22	4.18	2.12	6.06	Pt. Victoria ..	0.33	3.18	3.38	1.87
Riverton	0.32	4.46	3.60	7.68	Curramulka .	0.30	3.67	3.01	3.00
Tarlee	0.16	4.06	2.55	6.29	Minlston ...	0.49	3.42	2.76	2.92
Stookport ...	0.20	3.86	2.44	4.93	Stansbury ..	0.31	3.45	2.32	3.35

RAINFALL TABLE *continued.*

Station.	For April, 1911.	Average to end April.	To end April, 1911.	To end April, 1910.	Station.	For April, 1911.	Average to end April.	To end April, 1911.	To end April, 1910.
Warooka....	0.23	3.02	4.51	2.20	Bordertown .	1.04	4.06	4.23	4.26
Yorke town .	0.13	3.27	3.38	3.42	Wolsley....	0.51	3.73	3.61	4.69
Edithburgh..	0.14	3.46	2.37	3.92	Frances.....	1.35	3.95	5.19	4.87
Fowler's Bay.	0.48	2.44	1.66	0.28	Naracoorte .	1.47	4.41	5.25	5.70
Streaky Bay.	0.04	2.85	1.99	0.12	Lucindale ...	1.45	4.34	5.54	6.16
Pt. Elliston..	0.10	2.63	2.13	0.41	Penola.....	1.38	5.24	7.42	6.81
Pt. Lincoln..	0.18	3.64	2.39	1.01	Millicent ...	1.67	5.88	8.16	4.91
Cowell	0.03	3.15	1.34	3.56	Mt. Gambier.	2.31	6.54	8.83	6.09
Queenscliffe .	—	3.24	—	4.76	Wellington ..	0.23	3.75	3.81	5.25
Pt. Elliot....	0.22	4.35	2.46	3.99	Murray Bridge	0.12	3.61	3.05	6.74
Goolwa	0.19	3.85	3.86	3.64	Mannum ...	0.11	3.11	1.85	5.81
Meningie....	0.45	3.90	3.07	3.70	Morgan	—	2.36	2.85	3.39
Kingston....	0.78	4.58	4.94	4.38	Overland Crnr	—	3.07	4.25	6.06
Robe	1.16	4.46	6.01	4.68	Renmark ..	—	2.69	4.69	4.69
Beachport...	1.32	5.21	6.78	3.93	Lameroo ...	0.14	—	1.33	4.16
Coonalpyn ..	0.23	3.76	3.61	4.21					

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on May 1st:—

BUTTER.

Although the supply of cream is shortening, yet the reduction is not so great as is usual at this period of the year, and the general quality is good. The prices are the same as at the finish of the month of March, viz.—Superfine, 1s. 0½d.; pure creamery, 11½d.

Messrs. A. W. Sandford & Co. report on May 1st:—

POTATOES.—No importations from eastern States, Hills and Gambiers furnishing sufficient supplies. New locals, £4 10s. to £5, Adelaide; Gambiers, £4 5s. to £4 10s. on trucks, Adelaide or Port, per ton of 2,240lbs.

ONIONS.—Yields this season are considered fairly heavy, new locals, £3, Adelaide; Gambiers, £3 5s. to £3 10s., Adelaide or Port, per ton of 2,240lbs.

BUTTER.—Best factory and creamery, 11d. to 1s 0½d.; second grade factories, 9d. to 10d.; choice separators, dairies, 10½d. to 11½d.; medium quality, 8½d. to 9½d.; stores and collectors', 8d. to 9d. per lb.

EGGS.—Prime, guaranteed new-laid, hen, 1s. 5d.; duck, 1s. 6d.; or refrigerator, 1s. 1d.; well-preserved, 10d. to 10½d. per doz.

CHEESE.—Factory makes, 5d. to 6d. for mellow quality; aged lots, 4d. to 4½d. per lb.

BACON.—Factory-cured sides, 6½d. to 7½d. per lb.

HAMS.—In calico, 8½d. to 9d. per lb.

LARD.—In skins, 6½d.; bulk, 6d. per lb.

HONEY.—Prime clear extracted, new season's, 2½d.; beeswax, 1s. 2d. per lb.

ALMONDS.—Soft shells, Brandis, 6½d.; mixed soft shells, 6d.; hard shells, 2½d.; kernels, 1s. 1d. per lb.

LIVE POULTRY.—Good table roosters, 2s. 9d. to 3s. 3d. each; plump cockerels, 2s. to 2s. 6d.; hens and light cockerels, 1s. 6d. to 1s. 9d.; ducks, 2s. to 3s.; geese, 3s. 6d. to 4s. 6d.; pigeons, 6d.; turkeys, 7d. to 10d. per lb., live weight for fair to good table birds.

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		May.	June.			May.	June.
Amyton	991	—	—	Meningie	1014	13	10
Angaston	*	13	10	Merghiny	1004	4	1
Appila-Yarrowie	*	—	—	Millicent	1017	9	13
Arden Vale & Wyacca	991	—	—	Miltalie	1004	13	10
Arthurton	*	—	—	Minlaton	1001	20	17
Balaklava	997	—	10	Mitchell	1005	13	10
Beetaloo Valley	994	—	—	Monteith	1009	13	—
Belalie North	994	6	10	Moonta	*	—	—
Blyth	998	16	13	Morehead	*	—	—
Bowhill	*	—	—	Morgan	*	13	—
Bowmans	*	11	8	Morphett Vale	*	—	—
Brinkworth	*	—	—	Mount Bryan	996	6	10
Bute	*	—	—	Mount Bryan East	996	6	3
Butler	*	—	—	Mount Gambier	1017	—	—
Caltowie	995	6	10	Mount Pleasant	1015	12	9
Carrieton	*	11	8	Mount Remarkable	*	11	8
Cherry Gardens	1011	9	6	Mundoora	*	—	—
Clare	999	12	9	Murray Bridge	*	—	—
Clarendon	1011	8	12	Nantawarra	1000	10	7
Colton	1002	13	10	Naracoorte	1018	13	10
Coomooroo	991	15	12	Narridy	997	—	—
Coonalpyn	1007	—	—	Northfield	*	9	6
Cradock	*	—	—	Orroroo	*	—	—
Crystal Brook	*	—	—	Parrakie	1009	6	3
Cummins	1003	13	10	Paskeville	1001	11	8
Davenport	*	—	—	Penola	1018	6	3
Dawson	*	—	—	Penong	1005	13	10
Dingabledinga	*	12	9	Petina	†	—	—
Dowlingville	*	—	—	Pine Forest	1001	9	6
Elbow Hill	1003	—	—	Port Broughton	*	12	9
Forest Range	1011	11	8	Port Elliot	1015	20	17
Forster	*	4	1	Port Germein	*	—	—
Frances	*	12	9	Port Pirie	*	6	3
Freeling	†	—	—	Quorn	993	13	—
Gawler River	1000	—	—	Redhill	*	16	6
Georgetown	995	13	10	Renmark	*	—	—
Geranium	1005	27	24	Saddleworth	*	19	16
Green Patch	*	8	5	Salisbury	1000	2	6
Gumeracha	1011	8	5	Shannon	1006	—	—
Hartley	1012	13	10	Sherlock	*	13	17
Hawker	992	8	12	Stockport	*	—	—
Hookina	992	—	10	Strathalbyn	*	15	19
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Kadina	*	11	8	Tatiara	*	—	—
Kalangadoo	1016	13	10	Uraidla and Summert'n	1015	1	5
Kanmantoo	1012	12	10	Utera Plains	1006	13	10
Keith	1016	—	10	Waikerie	*	—	—
Kingscote	1013	9	6	Watervale	*	—	—
Kingston	*	27	24	Wepowie	993	—	—
Koppio	†	11	8	Whyte-Yarrowie	*	13	10
Kybybolite	1017	11	8	Willowie	*	5	2
Lameroo	†	—	—	Willunga	*	6	3
Lipson	*	—	—	Wilkawatt	1010	13	10
Longwood	1013-14	10	7	Wilmington	†	10	7
Lucindale	*	20	—	Wirrabara	*	—	—
Lyndoch	†	11	8	Woodside	*	—	—
Maitland	*	6	3	Yadnarie	1007	13	10
Mallala	1000	1	5	Yallunda	†	—	—
Mannum	1008	27	24	Yongala Vale	997	6	3
Meadows	1014	12	10	Yorke town	1001	13	10

* No report received during the month of April.

† Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, March 21.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Brown (chair), Cormack, Ward, Crisp, Gum, Baumgartel, and Thomas (Hon. Sec.).

PICKLING SEED WHEAT. Some discussion took place concerning bluestone pickle for seed wheat. Some members used the bluestone solution at the rate of 1½ lbs. to 10 galls. of water, while others used as much as 2½ lbs. to 10 galls. The former strength had proved quite effective with very smutty seed, while those who used the stronger solution mentioned above, admitted that it destroyed some of the seed.

Arden Vale, April 10.

(Average annual rainfall, 16 in.)

PRESENT.—Messrs. M. Eckert (chair), A. Eckert, E. and W. Klingberg, O. and P. Haunemann, Ficker, Willis, Pearce (Hon. Sec.), and several visitors.

CONFERENCE ECHOES.—Members referred to the poor attendance of delegates at the Quorn Conference. The efforts of the Quorn Branch deserved better support. They were particularly gratified at the strong staff of departmental officers present, as well as two members of the Government.

STAR THISTLES.—The Chairman drew attention to the fact that there were large numbers of star thistles in the district which, if not checked, would become a pest.

RAINFALL AND REVIEW OF RETURNS.—It was stated that the Chairman's record showed the rainfall as being 16·18 in. for 1910. Members considered the average yield of wheat per acre for Yarrah and Wyacca was 11 bush. per acre.

FAREWELL TO HON. SECRETARY.—This opportunity was taken to express members' appreciation of the good work done in the interests of the Branch by Mr. C. Pearce, who had acted in the capacity of secretary or chairman for six years. Mr. Pearce was now about to leave the district.

Coomooroo, April 10.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Berriman (chair), Brown, Ward, Robertson, and Bruce (Hon. Sec.).

LAMBS FOR EXPORT.—A paper on this subject was read by the Chairman. Even on the smallest farm, he said, it paid to keep a few sheep. It was not so much a question of quantity, but quality, if money was to be made. Only first-class ewes should be procured, and they should be four to six tooth animals with large frames. Young rams should be kept; also four to six tooth. Ewes needed careful watching in the lambing season, especially in cold, wet weather. They were liable to get down and be unable to rise, or perhaps be unable to deliver their lambs, when a helping hand might save both ewe and lamb. Breeding ewes going from dry food to green grass were apt to scour, and if not kept clean around the breech and udder lambs would wean themselves and might not get properly fat for market. It was a great mistake to send inferior lambs to Adelaide. Being unfit for butchers or freezers, they were sold at ridiculous prices. He

thought it wiser to send lambs to Adelaide when properly fat, in preference to selling to country buyers, as some of the country buyers were not able to distinguish between a fat and a poor lamb. He quoted an experience of two years ago to prove this statement.

Hawker, April 10.

(Average annual rainfall, 11½ in.)

PRESENT.—Messes. Rhymer (chair), Hirsch, Pyman, Feineler, and Smith (Hon. Sec.).

LOSS OF CATTLE.—Mr. Hirsch called attention to the death of several cattle in the district under conditions which pointed to dry feed being the cause. All those affected came from country where there was none of the annual saltbush or buckbush, and they were unable to get anything other than the driest fare. Mr. Pyman thought the rabbits were responsible for the trouble. They ate every scrap of green feed, and the cattle had no chance. He considered it was quite time that concerted action was taken to destroy this pest. Several effective methods were available if only all the landholders would systematically tackle the job. The rabbits could at least be reduced so that they would not get all the green feed, which usually came up among the dry grass in the summer.

Hookina, April 15.

PRESENT.—Messes. Sheridan (chair), A. and J. Henschke, Stone, Gloede, Madigan, (Hon. Sec.), and one visitor.

SEEDING OPERATIONS.—The following paper was read by Mr. Stone:—"Seeding time is at hand, so that a discussion on this subject may result in our avoiding errors made last year. As early rains are the exception in this district nothing can be gained by working fallow in a dry state; therefore the sowing of stubble ground should be proceeded with till rain comes to bring up stray oats and weeds on fallow. The sowing of fallow should then result in a clean crop and a good return; while stubble ground, even though sown after rain, seldom returns more than half as much as fallow. It is evident that farmers in this part, where so much land is available for cultivation, lose a good deal by omitting to fallow more land in the winter. In many places last year the yield from stubble paddocks was not more than 6bush. to 8bush., whilst fallow returned that number of bags. It is readily seen that much more work is caused by continually sowing stubble ground. On most farms, however, a little stubble land will be cropped. This should, therefore, be lightly cultivated and sown with about 40lbs. seed per acre. This is sufficient, since a little will have shaken out from the previous crop. On fallow land 50lbs. of seed per acre could be sown. Although it is a mistake in our dry area to sow too thickly, care should be taken not to go to the other extreme. A thick crop, when well advanced, does much to shelter the top soil from drying winds and the sun. A thick crop is liable to show a dwarfed head; but this defect can also often be attributed to continual cropping of land. Working land in a dry state in successive years, in my opinion, is favorable to flag smut. Care should be taken in selecting seed wheat, so that only large, plump grains will be sown. A farmer can do much to select his seed wheat at harvest time, when a small patch of wheat of superior quality can be reaped separately by the harvester with little trouble. It should be run through a winnower before sowing to remove small grains and any foreign matter, as in the hurry of harvest the average farmer's aim is simply to secure a marketable sample. The result is that when sowing time comes the drill gets choked. It is generally necessary to pickle the seed. For bluestone, 1lb. in 10galls. of water is a good strength. I prefer the seed drill to the old method of broad-casting. Wheat is thus sown to a regular depth and can be harrowed with less injury after it is above ground. This treatment is very beneficial when, through the absence of early rains, the first rain causes a crust to form on the top and so prevents later rains from soaking into the soil properly. Wheats seemingly suited to this district are Bluey, Fill-the-Bag, Purple Straw, Federation, and King's Early. Seeding should start at about the beginning of April, and one team of eight horses should then be capable of putting in at least 300 acres." Mr. A. Henschke thought the appearance of flag smut was, to some extent, dependent on the nature of the soil. He had been troubled with this disease in his crops sown late, after rain on well-worked soil, just as much as where the seed was put into dry soil. He had found the crop did better if the soil was harrowed after rain. The Hon. Secretary emphasized

the necessity of grading and selecting seed. If farmers graded their seed and only sowed the best grain in dry seasons, he believed the wheat would gradually become hardened and more drought-resistant.

Quorn, April 15.

(Average annual rainfall, 13½ in.)

PRESENT.—Messesrs. Thompson (chair), Finley, Brewster, Shulze, McColl, Cook, and Patten (Hon. Sec.).

BACON-CURING.—The Chairman read a paper setting forth a method of preparing mild cured bacon of golden color. The paper ran somewhat as follows:—"Choose a cool day for killing, and let the pig rest quietly for 24 hours beforehand. Scald quickly in water three parts hot to one of cold. Take the carcass out quickly and scrape every part clean. Hang up, open, and remove entrails as speedily as possible. Dispatch just here is of the greatest importance. Remove the leaf lard so that the carcass may cool quickly, and hang it in a cool place for 12 hours. When cut up, put the sides with the flesh upwards. Sprinkle with salt and saltpetre, and leave for three or four hours. If curing is done in pickle there is no need to rub the bacon when applying the salt and sugar, but care must be taken not to wash off the salt. Leave the meat in the pickle 48 hours. The blood should be worked out of the veins at the time of first moving the meat, working downwards from the knuckles. Then replace in the pickle, putting what is at the bottom of the vessel on the top, and *vice versa*. This changing of the sides should take place each day for nine days. Large stones may be placed on the sides to keep them under the pickle. After this they may be stacked one on the other on floor or bench, and moved every other day three times. Then brush off all salt and soak in cold water for 12 hours. Change the water and leave for six hours. Then wash in plenty of hot water, brush well, string up, and wipe with a dry cloth. When dry, trim off loose pieces of flesh from surface or flesh sides. Wipe over the skin with a little olive oil on a cloth and place the bacon in the cool smoke of kauri sawdust. The latter must not blaze. A little saltpetre sprinkled on the sawdust will give the skin a nice bright appearance. After smoking, clean the skin with an oily rag, and wipe finally with a clean cloth." Mr. Thompson added that it might be thought that a good deal of this work was unnecessary, but in his opinion the extra price realised for bacon cured in this way made it worth while. Mr. McColl thought it was difficult for farmers to prepare as good a sample of bacon as the factories turned out. The flies were a great nuisance to contend with. Rolled bacon kept best and did not dry so much as the sides. He thought pigs returned a profit more quickly than any other animal, but would send them to the Adelaide market when fit. Members agreed that for home killing pigs of about 80lbs. to 112lbs. weight were best.

Wepowie, March 21.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Halliday (chair), Gale, Rielly, Crocker, Chrystall, Fuller, Ornock (Hon. Sec.), and five visitors.

WHEATS FOR DISTRICT.—Some discussion took place concerning the best varieties of wheat for this district. For all-round yielding qualities first place was given to Federation, followed by Dart's Imperial, Nobby, and Stenwedel. Most of those present considered a bushel of seed and 75lbs. of super. per acre about the best rate to sow in this district.

Wepowie, April 11.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Crocker (chair), Gale, Roberts, Rielly, Chrystall, Pearce, Rooke, Knauerhase, I. and T. F. Ornock (Hon. Sec.), and three visitors.

HORSE-BREEDING.—A paper on this subject, written by Mr. Venning of Crystal Brook Branch and published on page 309 of October, 1910, issue of the *Journal*, was read and discussed. Mr. Rielly and others were of opinion that light work helped to develop mares. Mr. Rooke considered it very important to properly care for foals during their first year. This had a lot to do with the development into a good horse.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, April 10.

PRESENT.—MESSRS. Burton (chair), Petrie, Murphy, Jacobie, Bartrum, Ryan, Woolford, Bartrum (Hon. Sec.), and two visitors.

SUMMER VEGETABLES.—The following paper was read by Mr. Petrie :—“A good supply of water is necessary for growing summer vegetables, and unless it is used freely the growth will be very stunted and the quality of vegetables grown very poor. A sandy loam is an ideal soil for vegetable-growing, being easily worked and well-drained. With a liberal supply of stable manure a good supply of vegetables can be grown for home use or for sale. A good assortment of vegetables is necessary, and the selection of varieties to suit public taste and the locality. I would advocate planting for early crops—carrots, parsnips, and beetroot in the winter. These would be ready in the early part of the summer. About the best varieties in carrots are Intermediate and Shorthorn. Of parsnips Hollow Crown is the most popular variety. Beetroot is a good line for summer, being extensively used in hot weather, and several varieties could be tried. Long Blood Red and Egyptian Turnip-rooted are both good sorts. French beans can be grown in the early part of summer, and a second crop may be put in in January or early in February. The dwarf varieties are preferred, and I would plant Burpee's Stringless Green Pod, Emperor William, and Canadian Wonder. Peas are well worth a trial. A planting could be made in the spring and a later one could be put in at about the middle of February. Two good varieties are Yorkshire Hero and Daisy. A supply of early squashes, marrows, trombones, cucumbers, and melons can be grown with very little trouble, and will yield heavy crops if not very profitable ones; but it is necessary to have a variety of these. I think potatoes would be a profitable crop if two crops in the season were grown, planting one in August and one in February. I would give preference to White Elephants, Snowflakes, and Pinkeyes. Onions do exceptionally well here. Some brown and some white varieties should be grown. Brown Spanish and Silver King are two good varieties; but care should be taken not to plant too deeply or the bulb does not develop well. Last but not least are tomatoes, and these are easily grown. Plants should be raised early, and when danger from frost is over planted out 3ft. apart with 4ft. between rows. The most suitable varieties for the district are Earliana, Early Pride, Ignatum, and Buckeye State.”

Belalie North, April 8.

(Average annual rainfall, 16½ in.)

PRESENT. — MESSRS. O'Leary (chair), Murdock, Atkin, P. and R. Quin, P. and D. Fox, Cummings, Hall, Arndt, Bladon (Hon. Sec.), and three visitors.

CARE OF IMPLEMENTS AND MACHINERY.—A practical paper on this subject was read by Mr. Arndt. He said that the three classes of implements for the three classes of work, viz., preparing land, seeding, and harvesting, should be thoroughly overhauled and repaired at the end of the season, so that they would be quite ready for work when again wanted. Every farmer should keep on hand a good supply of bolts of various sizes, so that breakages could be properly repaired without delay. A small box of bolts, etc., could with advantage be fixed on every plough and similar implement, so that parts could be tightened up while the team was feeding. Machine belts should be well oiled to keep them supple. The free use of paint on woodwork of implements, machines, wagons, &c., lengthened the life of these farm appliances more than was generally recognised. Finally a good weather-proof shed was necessary for the protection of all movable farm plant, and, all things considered, iron was the best material of which to make it. Members generally agreed that farmers would be well advised to put into practice the good advice tendered in the paper.

VETERINARY WORK.—Some discussion took place regarding the lack of a veterinary college in this State, and it was decided to ask the Advisory Board to approach the Government, asking that such a college should be established. Also to invite other Branches of the Bureau to indicate whether they would be prepared to support a movement in this direction.

Caltowie, April 7.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. N. E. and E. Hewitt, J. G. and J. Lehmann, (Graham, Williams, Wildon, Royal, Collins, Petatz, Moore, Aney, and F. Lehmann (Hon. Sec.).

FARMYARD MANURES.—A paper on the use of farmyard manures was read from page 802 of the March issue of the *Journal*. Members agreed that this valuable asset on the farm could be put to excellent use if it were not so difficult to secure labor.

FARM LABOR.—The following paper was read by Mr. F. Lehmann:—"The most serious problem that the farming community has to face is the lack of suitable farm labor, and after careful consideration I must unhesitatingly admit that, in a very great measure, the farmers have themselves to blame. The effect of a custom that has been long observed by most farmers, viz., that as soon as possible after they have finished any particular work for which a man was absolutely necessary he is dismissed, is that when the emergency again arises the men are not to be found. These farmers, of course, expect a man by some magical means to appear. I maintain that it should be the farmers' aim, that it would be to their interest, to, if possible, employ a man or men constantly. There should not be any slack times on the farm; but, unfortunately, many of us make these slack times when work that is necessary on every farm should be done. Can we expect men to work on farms when they know it is only offered them when we cannot do without them? Another evil that has grown out of the farmers' labor system is that at present, generally speaking, a very inferior type of farm laborer exists. Of course, there are exceptions. This, however, is due to a certain extent, to the fact that other labor conditions seem to offer better inducements; but it is chiefly due to the reason that, although we hear a great deal about the farmer's work being something in the nature of a science in which method and system go for everything, yet many farmers persistently employ very incapable men for the sole reason that they may be cheap. Personally, I think the cheap man generally turns out dearest in practice. We should encourage, wherever possible, boys to work on farms, for it is on them that our future labor depends. We should make it worth their while, and teach them as much as possible, and give them some little interest so that an intelligent interest may be inculcated. I consider it would pay farmers who can afford it to erect cottages for married men, and if a young man is employed, instead of discouraging him from marrying, do your best to see that he gets into double harness. Almost invariably he will be more reliable and trustworthy when he has some little anchor to remind him of his responsibilities. If they were allowed a few fowls, a horse, and a cow I am sure many men would hesitate before leaving. I still believe that farm labor can be made more popular amongst our laborers than it is at present. I know that there is a class of men to whom the very mention of a farm is like a red flag; yet there are plenty who prefer farm life, because the opportunity to save money is good and the work, taken on the whole, is undoubtedly the lightest of any manual occupation, for, excepting harvest time, the hours of actual work are short and the work consists mainly of driving a team. I present this subject to you as it is one that affects us greatly, and is worthy of our most serious consideration. If things continue as at present, sooner or later a crisis will come, and then we, instead of making terms with the men, shall find that we must accept whatever is offered to us."

Georgetown, April 15.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. A. Hill (chair), G. Hill, McAuley, P. and J. Higgins, W. and A. Thomson, Fogarty, Newman, Eyre (Hon. Sec.), and one visitor.

TAKEALL.—A short paper on this wheat disease was read by Mr. Fogarty. He had come to the conclusion that ploughing or seeding when the soil was dry and leaving fallow in a loose and rough state favored the disease, and resulted in serious losses of crop. If fallowing had to be done when the soil was dry and hard the rough soil should not be sown until after a good rain had settled it. On one occasion he had ploughed up 40 acres in the middle of a 200-acre paddock. It was very rough, and so he harrowed it down after a good rain until it was apparently the best plot in the paddock. It was afterwards sown when in a dry state and the crop on the 40 acres was deadly affected by takeall, while there was scarcely any appearance of the disease in the other 160 acres. Last year he had a similar experience, and had now quite made up his mind that it was unwise to sow fallow when it was dry. He thought each member of the various Branches should be asked to say all he knew about this serious wheat disease.

Mount Bryan, April 10.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. Hatherly, (chair) Schmidt, Thomas, Wardle, and H. L. Hatherly, (Hon. Sec.).

WHEAT-GROWING.—An interesting paper on "Wheat-growing under Local Conditions" was read by Mr. Schmidt. It ran as follows:—"In this district it is unwise to start drilling in wheat very early. If, however, you do start early and the ground is damp drill deeply, as the wheat then has a better chance of getting enough moisture to carry it through. Through working the land a great deal the moisture dries out of the top soil, and if the seed is drilled in shallow some will germinate and some will not. When the land is in good condition and damp enough, wheat should be drilled in only just deep enough to cover the grain. It should then not be left without harrowing it over. I drilled one paddock in last year and harrowed part of it the opposite way to the drilling with very sharp harrows. This part yielded between 3bush. and 4bush. per acre more than the part not harrowed. The same amount of wheat and super. per acre was used, and all was put in at the same time. Fallow land should be cultivated from 2in. to 2½in. deep before seeding. A rib roller should then be used before drilling, unless the land is too wet. If able to plough stubble land early, harrow it down well and then roll it with a rib roller. Leave it like this until it is time to put it in, and then before drilling cultivate it again. Treated in this way it is almost as good as late fallow. The next best procedure, in my opinion, instead of ploughing is to cultivate early and leave it until ready to drill. Then cultivate it the opposite way to the previous cultivating, and drill it immediately afterwards. This method is better than ploughing in one respect, because it does not leave the soil so lumpy, and does not let the moisture dry out so easily. Wheat should always be drilled in north and south. If there should be more than one kind of wheat in the same paddock cut the hay roads north and south. It frequently is impracticable to reap east and west on account of the wheat being lodged; it generally leans towards the east, so that it is far better for harvesters to work north and south. For the last three years I have sown mostly Federation and Yandilla King, and have always had better yields from these than from other varieties. On fallow land I find very little difference in the yields of Federation and Yandilla King, but on the stubble lands Federation always beats the other variety by 5bush. or 6bush. per acre. Only the cleanest of wheat should be used for seed, and it should be perfectly free from bunt. If sown early and dry, wheat would be better not pickled, but if pickled it should be in a very weak solution."

Mount Bryan East, April 6.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. S. Thomas (chair), C. and W. Dare, R. Thomas, Doyle, Tralaggan, Williams, Quinn (Hon. Sec.), and two visitors.

WOOL PRODUCTION AND MARKETING.—The following paper on this subject was read by Mr. C. Dare:—"Wool grown in the northern part of South Australia is mainly of the Merino type. It has been brought to its fine standard through the fitness of the climate and careful breeding. The lightness of the fleece and tip in saltbush country is due to the dryness of the climate and of the feed. It is advisable in this country to use rams that have a fair amount of grease in their wool, to keep the flock from becoming too dry and harsh. Those who combined wool-growing and lamb-raising should be careful to keep their flock wool from becoming too coarse and harsh, in consequence of mating with Dorset Horns, Leicesters, &c. The object of classing the wool is to place it on the market so that the clip brings its true value. For the best results the work must be done scientifically to get the keenest competition, honestly to gain the confidence of the buyers, and carefully to draw attention to the clip. Scientific wool-classing is placing the wool into parcels to suit the various sections of buyers. For instance—on account of a heavy duty—America wants light wool (robust Merino). Bradford buyers want sound wool of good length, broad staple—a combing wool. Continental buyers take the short combing wool to suit their machinery. The writer then described the various classes into which wool was sorted for marketing, and continued—"The skirting should always start behind the shoulder and work towards the neck, taking off all the rough portions. The sides and breech should then be taken off. In places where sand is very bad the sandy portions of the back should be taken out. On small holdings too many classes are not advisable and the fleeces should not be skirted as deeply. The bale should be branded on one side and the open end. Lamb's wool should be divided into three or four classes, according to the size of the flock."

Narridy, April 1.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. Haren (chair), H. and W. F. Nicholls, Liddle, Satchell, Dunsford, and Kelly (Hon. Sec.).

EXPERIMENTAL WORK.—Mr. W. F. Nicholls reported on the variety experiment plots conducted by him for the Department. The wheats were sown on 23rd and 24th May with lewt. mineral super. per acre. The rainfall from seed time to harvest was 13.82 inches. The yields were as follows:—Yandilla King, 25bush. 23lbs.; Tarragon, 23bush. 11b.; Bunyip, 22bush. 59lbs.; Marshall's No. 3, 22bush. 49lbs.; King's Red, 22bush. 44lbs.; Cluyas, 19bush. 51lbs.; Federation, 13bush. 31lbs.; Comeback, 12bush. 32lbs. Mr. Nicholls added that Federation had suffered badly through a heavy fall of rain occurring immediately after sowing. He had harrowed the plot, but it was always backward. Bunyip was considered by members to be a variety that was well suited to the district.

Yongala Vale, April 8.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lloyd (chair), Miller, Battersby, Chigwidden, Menz, Fowler, Scott, Schmidt (Hon. Sec.), and four visitors.

CONFERENCE NOTES.—Mr. Battersby reported on the conference recently held at Whyte-Yarcowie. He touched on several of the questions debated, and said he was strongly of opinion that it would pay farmers to go in for selection of seed wheat.

CROSS FERTILISATION OF WHEAT.—Some discussion took place concerning the cross fertilisation of wheat, and it was decided to ask the Department whether the pollen of one variety of wheat would be transferred by the action of insects and wind to another head of a different variety growing alongside, and whether cross fertilisation would in such case take place. [It could scarcely be said to be impossible that this should occur, but in practical experience it rarely does, for the reason that when the anthers appear, and the wheat is in the state popularly known as blooming, the first stages of fertilisation have already occurred.—Ed.]

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Balaklava, April 8.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Goldney (chair), Roediger, Tracer, Roberts, Wagener, Neville, Uppill, Burden, Thomas, Fisher, Hoepner, and Banyer (Hon. Sec.).

SEEDING OPERATIONS.—A paper under this title was read by Mr. Roberts. To get the most out of a farm, he said, the farmer must work systematically and arrange work so that the maximum could be done with a minimum of labor. Seeding operations formed a most important part of the year's work. It was always advisable to procure seed early if it had to be purchased, so that it could be graded or cleaned at slack times. If the purchase of seed was left till nearing seeding time it was sometimes impracticable to secure just the right variety and quality desired, and grading and other preparatory work was liable to be rushed through. Fertilisers should also be purchased in plenty of time. Pickling, with a bluestone solution not too strong, could be done at any time. He liked to have the seed pickled a week or two before seeding, as it then ran through the drill more freely. He considered 11b. of bluestone to 4galls. of water a fair strength for solution, and with this would pickle 12bush. of wheat on a floor. The one year in three system of cropping paid best, i.e., wheat, grass, and fallow in succession. Just before seeding the fallow should be cleaned up with a shallow working with the cultivator, just deep enough to kill the weeds and form a fine seed bed. It was unadvisable to plough fallow at seeding time, as this left the soil in too loose a state. Drilling should be done with great care, sparing no pains to spread the seed and manure evenly. It was a good plan to screen the manures before drilling, and break all lumps, &c. This would often

save a breakage and consequent loss of time when drilling. In clay soil the seed should be drilled in as shallow as possible, and in light and loamy soils to a depth of 1½ in. to 2 in. A bushel of seed and lewt. of manure per acre was about the right quantity for this district. A lengthy discussion followed. Mr. Traeger had noticed where the land had been cropped every second year that the results were better than on land left for the third year. Land worked to a good seed bed more easily on the two-year system. Mr. Hoepner thought it better to grow oats after wheat rather than leaving it to grass. The grass seed was difficult to get rid of. He could not cultivate his land much because it drifted. Last season he realised 10 bush. more per acre from land that had been sown with oats than from that left in grass. Mr. Neville knew of a farm at Kybunga where better results had been realised from land on which the stubble had been burnt off and fallowed straight away than where the three years' system was practised. He was trying a crop of oats on 200 acres this year. Mr. Thomas did not favor the three years' system. He thought it was a good plan to use the disc cultivator, and in June to cross plough to make a good seed bed. Mr. Baker had not given up the three-year system yet, but thought he would do so. He had found that a man got much information by watching his neighbor's methods. The best crops now were those on the two-year system. The land was easier to break up, and the weeds were more easily killed. Mr. Wagener did not favor the three-year system. By burning off the stubble seeds of weeds were destroyed. On his hard clay land he had to harrow and cross harrow, or the harvester would shake to pieces. The Chairman said that in his experience far better crops had been obtained by fallowing stubble land and leaving it for two years than by the three-year system. Oats grew better when the stubble was burnt off. Leaving the land to grass resulted in a dirty crop. Some persons only scarified stubble land. He thought that would do sometimes on the lighter land, and would save a good deal of work and produce a better crop. Mr. Roberts, in reply, said that in regard to the two-year *versus* three-year system, he spoke from experience. His lowest average during the last 10 years had been 17 bush. per acre, and his highest 33 bush. He did his seed-pickling on a cloth, sprinkling the solution over it and turning with a shovel. By shaking the ends of the cloth the grain was again thrown together. Every lot of grain had fresh solution sprinkled over it, while in dipping in a cask the same solution with a little more added was used over and over again.

Blyth, April 11.

PRESENT.—Messrs. McEwin (chair), Zireck, Schuster, Schulze, J. and W. Pratt, Gell, Mügge, and Eime (Hon. Sec.).

FARM GARDENS.—A paper on this subject was read by Mr. Gell. It was surprising, he said, that while such an advance had been made in cereal-growing and in the class of live stock to be found on the farm, so little attention was paid in this district to the gardens. He then dealt at length with the æsthetic and practical phases of the question, and said that he would like to see a spirit of competition among farmers to stimulate the production of creditable gardens and homesteads. Possibly some award might be made for the best garden in the district. The paper continued much as follows:—"It will be necessary to have a reliable supply of suitable water. The Bundaleer water is now reticulated over a good part of our district, and failing a better quality of water it is quite good enough for most plant life. Where this water is not available, sink wells, dams, or tanks. Flooding trees by turning in running water during autumn, spring, and summer rains will keep them going. Whatever system of watering is adopted see that there is an ample supply when it is required. I would recommend that all the garden area be rough ploughed, either in the autumn or spring, to a depth of at least 10 ins.; then leave it to mellow for some time, some months, if possible; then sow a crop of oats or peas; and, after taking these off, attend to the laying out of the garden. The soil should have a good dressing of well-decayed farmyard manure well dug in. This should be repeated annually. Commercial fertilisers are also beneficial applied in a liquid form to the plants. Should the soil be deficient in lime this must be added; and where the soil is stiff and heavy our scrub sand should be liberally worked into it. The garden should be enclosed with a strong wire-netted fence; and immediately inside this, on the north and east, I would recommend planting a row of Brandis almonds or tagosasti as a breakwind. In bleak and exposed localities I would advise planting a good miniature forest of sugar gums, &c., on the northern side, but these should not be planted nearer than a chain from the garden. All the garden beds should be below the level of the paths. The surface soil should be kept free and open and never allowed to cake. A good thick mulch of decayed manure, leaves, &c., should be spread all over the garden in the late

spring and dug in in the autumn. One of the best and most beneficial liquid manures is made with cow manure—really good results may be obtained from its application. It will be necessary to make intelligent and constant use of the spade, the fork, the knife, and the hose in the garden. The knife is just as necessary as is the frost to the wheat, but is required to be used more often." In the discussion the general opinion was that more farmers could have good gardens, but that the ideal set in the paper was rather high.

Clare, March 17.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. McKenzie (chair), Dux, Scales, Walker, Nolan, Hill, Lloyd, Berridge, Radford, Kollasche, and Knappstein (Hon. Sec.).

MIXED FARMING.—The following paper on this subject was read by Mr. James Scales :—" This subject is of great importance, and has been sadly neglected, in my opinion, through the abundance of good seasons. We must consider it in conjunction with the rainfall, quality of soil, and general climate conditions. There will be a distinction between the management of plain and scrub lands, and lands adapted for fruit-growing. I will deal with the Blyth district. The land values here are from £10 to £12 per acre. If well managed, from 500 to 600 acres ought to be ample, and at this price the farm should be improved, but probably the improvements will not be up to date. If the farmer has no family he will require one permanent man, preferably a married man. He should have a neat four-roomed house on a convenient part of the farm, with a salary of £1 10s. per week, and the right to keep a cow and horse and some fowls. The following plant will be required :—Say nine horses, as many of them as possible being mares. If there is no cocky chaff, it will be necessary to get two or three straw stacks. These should be in the paddock first intended to be grassed, and I suggest that they should be sown with lake salt. The cost would be very small. One small stack of straw sheaved should be in the farmyard where it may be chaffed, and used with molasses should a scarcity of fodder arise. If not, it can be used for thatching next season as soon as the stacks are built, thus saving every sheaf. Having a month to spare after harvest procure strainers, a few bundles of wire, &c., and straighten up all the fences. When this is done fuel must be procured for the next 12 months. Now get at the cultivation plant, overhaul every item, and see that every implement is put in first-class repair, including all harness, leather, etc. Traces should be used as far as possible, and should always be used on harvesters and drills. They cost more at first, but are cheaper in the long run, and comfort of the horses ought to be studied. Farm harness should be washed and oiled or greased four times a year. No doubtful winkers, couplings, or reins should be used. Discretion will have to be brought to bear on the varieties and quantity of seed, and the amount of manure per acre. Cultivate land thoroughly, and have experimental plots under the advice of the Department of Agriculture. Early fallow wins nine times out of ten. Seeding in this and similar districts should finish in May. Then start to fallow. One team of six horses with a good three-furrow plough should put up from 130 to 150 acres in two months, which is as much land as can well be fallowed. The mares which have been put to the stud, driven by the expert farmer himself, will keep the fallow harrowed down before being set with heavy rains. This will then be in good form for the cultivator. It appears to me that fallow left in its rough state is a waste of time and money. Let us see what a farmer can earn with good management, because 130 to 150 acres of crop will not keep two families and show a profit. He must keep four good cows to keep the farm going in dairy produce. After doing this and feeding themselves they ought to show a profit of £25 a year; pigs and poultry another £50. The progeny of his farm mares ought to be worth at least £50 a year net. A skilful man amongst sheep ought to net £100 a year after having his mutton and clearing his land of rubbish and weeds. I would not raise lambs on a farm this size. Then from sundry dealings he should make a further profit. A farmer should select the best implements and machinery, and only have what he requires." Mr. Scales added that he would like to see a law passed compelling every owner of stallions over one year old to pay a penalty of £50 unless he can show a certificate of pedigree from the stud-book of the State the animal was bred in. Mr. Dux agreed with portions of the paper, but would have liked more about the financial part, showing how things would work out according to Mr. Scales' estimates. Mr. Nolan wished to know how Mr. Scales would make £100 on sheep when he would not advise going in for fat lambs or breeding stud sheep. Mr. Scales said it could be done by selling the carcasses, returns from the wool, and doing a little dealing. Members agreed with remarks about straw stacks, and that stallions should all hold certificates of soundness before being allowed to travel.

Gawler River, April 11.

(Average annual rainfall, 18in.)

PRESENT—Messrs. J. H. Dawkins (chair), Davis, A. M. Dawkins, Richter, Hayman, Rice, Hillier, Dunn, Roediger, A. J. and F. H. Bray (Hon. Sec.), and a number of visitors, **IMPROVEMENT OF WHEAT YIELD**.—The Assistant Director of Agriculture (Mr. A. E. V. Richardson, M.A., B.Sc.) delivered an address under this title. Mr. Richardson dealt with the questions of cultivation, selection of seed, and manuring, and then spoke of the principal wheat diseases and the best means of prevention. By request he also explained the procedure in crossing and hybridising wheats. Members thoroughly appreciated the speaker's remarks throughout.

Mallala, April 10.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. A. V. Nairn (chair), East, J. Nairn, Griffiths, McCabe, G. and A. Marshman, Nevin (Hon. Sec.), and five visitors.

FARM LABOR.—The chairman introduced this subject for discussion in a brief paper. The present trend of affairs in the labor market suggested that farmers would soon have to pay a higher wage than they had in the past, and farmers had to consider whether it would be possible to profitably work their holdings if the changes indicated were brought about. It was more expensive to work a farm at the present time than it had been for the past 40 years quite apart from the question of farm wages. The value of land and the cost of necessary plant had increased enormously. The unfortunate position for the farmer was that while he had to buy machinery, manufactured under conditions of high wages or imported articles taxed by a protective duty, nearly everything he had to sell had its value fixed by prices ruling in countries of low wages. In a manufacturing business if wages went up, the owner had simply to raise the price of the finished article, but when wages increased on a farm the farmer was unable to raise the price of his wheat, wool, lambs, and other produce. If in the future an all-round rate of 9s. per day of eight hours were demanded for farm work, he very much doubted whether it would be possible for a farmer to pay this and make a living, unless he received the same measure of protection meted out to the manufacturer and his men. A duty on wheat, wool, and meat was of no benefit whatever, as the exporters' prices were governed by the laws of the supply and demand in the world's market. The alternative was an export bonus on these products. A spirited discussion ensued, the majority of members being of opinion that rigid uniformity of wages and fixed hours of work was impossible on the farm.

Nantawarra, April 13.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Sutton (chair), Sleep, Sinclair, Uppill, Dall, Nixon, Smith, R. and J. Nicholls (Acting Sec.), and 50 visitors.

WHEAT-GROWING.—The Assistant Director of Agriculture (Mr. A. E. V. Richardson, M.A., B.Sc.) delivered an address on cultivation of wheat. The audience was very appreciative and received answers to a number of questions at the close of the address.

Salisbury, April 4.

PRESENT.—Messrs. Moss (chair), Sayers, King, Kuhlmann, Heier, McNicol, Uriwin, Bagster, Richardson, Tait, Heidenreich, H. J. and A. Coher, Goodall, W. and F. Frost, Bussenschutt, E., A., and R. Whittlesea, McGlashan, Short, James, Uriwin, Shepherdson, Illman, Powell, Evers, J., J. E. V., A. J., and A. H. Harvey, V., L., and A. G. Jenkins, (Hon. Sec.), and about forty visitors.

VETERINARY LECTURE.—An illustrated address on horses and their diseases was delivered by the Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) before a large and appreciative audience. At the conclusion of his remarks concerning diseases to which the horse was liable Mr. McEachran urged members to pay the utmost care to the feeding and stabling of their horses.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Minlaton, April 15.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Page (chair), Vanstone, Martin, Parsons, and McKenzie (Hon. Sec.).

PRAS FOR ENSILAGE.—Mr. Parsons reported that he had made very good ensilage from green field peas. He advised members to give it a trial.

TAKEALL.—It was said that takeall had been very prevalent in this district this year. Members considered burning herbage on the land before fallowing, and keeping down barley grass and other weeds which might act as hosts for the fungus, were the best means of prevention.

Paskeville, April 13.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. Price (chair), Cowan, Brinkworth, Forbes, Wehr, V. Curnow, Pontifex, Goodall, Rundle, and Palm (Hon. Sec.).

BURNING v. GRAZING GRASS BEFORE FALLOWING.—Some discussion on this subject took place. Members were of opinion that it was better to burn grass immediately before fallowing, as the fire killed numbers of weed seeds which would otherwise spring up and make work in keeping the fallow clean. Mr. Brinkworth favored burning off the grass, and would then get some fallowing done before seeding time. Early fallow gave the best results in this district.

Pine Forest, April 11.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. Johns (chair), Hewett, Carman, Schultz, Inkster, Bayne, Smelt-Nelson, and Barr (Hon. Sec.).

EXPERIMENTAL WORK.—The Hon. Secretary reported that he had decided to continue experimental work on his own account along the same lines as he had been conducting plots for the department for a period, viz., wheat variety tests. The knowledge gained from work done was of considerable value to himself and the district generally, and for this reason he would experiment still further. Members heartily appreciated the work done by the Hon. Secretary and his intention to continue.

PROTECTION OF HAYSTACKS.—This subject was introduced by Mr. Bayne. He considered thatching was a lost art, and recently had had to pay £7 10s. to have a stack of about 100 tons thatched. He thought some instruction on thatching should be given to youths on farms. Mr. Carman had been able, with the aid of a skilled neighbor, to thatch a similar stack for £2 10s. Messrs. Nelson and Schultz favored the use of galvanized iron made in sections of suitable size for handling. It was quicker than thatching, and in the end cost less. It was agreed that the too common neglect of providing a covering for hay was very wasteful.

Yorketown, April 8.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Bartrum (chair), Koth, Correll, Domaschensz, Davey, Warren, Jung, Aldenhoven, A. E. and J. Anderson, Newbold, and Rohrig (Hon. Sec.).

SEASONABLE TOPICS.—A paper to the following effect was read by Mr. Davey: "Ploughing is now pretty general, and while deep ploughing is on this soil unnecessary and even injurious, yet I think the tendency is more frequently to plough too shallow. Our subsoil is usually either rock or rubble, and is best left alone, but ploughing being heavy work on the horses, and therefore slow, there is a tendency to run the plough a bit shallower in order to get over more ground in a day. I have noticed a few cases in which hard land has been ploughed with a paring plough turning a furrow of barely 2in., and the result has been a poor crop. From my experience I should say for fallowing plough about 4½in., for summer ploughing 3½in., and for late winter ploughing about 3in. Three and a half inch ploughing in hard ground will give over 4½in. of loose soil, and that seems to be sufficient. In paddocks of good size and free from waste patches it is not uncommon

to see a 12-horse team ploughing. I think it is advisable when over six horses are in one team that the driver should have assistance in harnessing and unharnessing; otherwise a good deal of time is wasted over those operations. Even with a liberal use of super-phosphates I think it unwise to crop land more than half the time. Some farmers are very successful with a system of crop and fallow alternately. My objection to that is that you get no feed off your land, having it all under cultivation the whole time. Moreover, it is doubtful if land will continue long to give its best yields without an occasional change to pasture. My opinion is that a five-year rotation is better—crop two years, graze two years, and then fallow. Some very successful farmers make a practice of sowing seed of some kind on the stubble land that they are leaving out, for the purpose of getting better feed. Oats or Cape barley are usually sown, and I believe the practice is a good one. For one thing, the weeds that grow with the wheat, such as mustard and sheep-weed, do not make good feed, either in quantity or quality, and if left in sole possession of the ground will produce a great deal more seed than they would if the other herbage grew thickly around them. Then there is the value of the extra feed obtained and the probability of the land being in better heart for wheat-growing afterwards, not only on account of the manuring by the stock, but also because soil that is full of roots is much more mellow and friable to work than that which has been bare. The question then arises whether it is better to burn off the stubble and drill in the seed with a small quantity of manure, or merely to sow the seed broadcast among the stubble before turning any stock in at all, and leaving them to tread it in. I am inclined to favor the latter, as it is much cheaper, and I think the shelter afforded by the stubble would be compensation to the plant for the want of manure, and the growth would therefore be quite as good. In the matter of sowing wheat I believe in pickling all except seed sown in dry weather and quite free from smut. I have found a solution of bluestone satisfactory used at the rate of 1½ lbs. bluestone to 10 galls. of water. I have had some of my crops spoiled through being sown too thickly, and others through not being sown thickly enough. The drills do not always sow the quantity of seed that is indicated on the machine. To rectify that, and ascertain exactly what I was sowing, last year I made 'buts' of all the bags, putting exactly 1½ bush. in each on the weighing machine. Then by carefully noting the acreage drilled I knew exactly how much I sowed per acre. I did not find any loss of time incurred through doing so, as the 'buts' were much handier in the field than the full bags would have been. Different kinds of wheat require different sowing. I sowed Marshall's No. 3 (pickled) at 100 lbs. per acre, and the resulting crop was somewhat thin; while with Federation (pickled) 70 lbs. per acre proved ample. In conclusion, the point cannot be too strongly emphasized that by improper farming, either from carelessness or want of knowledge of the requirements of the soil, the land will become wheat sick and cease to grow payable crops, while useless weed will thrive. If the right methods are found and followed the fertility of the soil will be not only maintained, but will be materially increased, in proof of which it is said that wheat lands of Europe which have been in cultivation for hundreds of years are producing better crops now than they ever did in the past, and give a yield per acre about 50 per cent. greater than the comparatively new lands of the United States."

WESTERN DISTRICT.

Colton, April 8.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Whitehead (chair), Kenny, Barns, Rice, Becker, and McBeath (Hon. Sec.).

SCIENCE AND AGRICULTURE.—Mr. Rice read a paper showing how the sciences, particularly that of chemistry, had contributed to the knowledge which enabled the farmers to work hand in hand with Dame Nature, and thus produce bountiful crops. By scientific selection and cross-breeding the wheat plant had been brought to its present high standard. The plant food needful for the production of various crops was searched out in the chemist's laboratory, and those elements which were lacking were by this means and by careful experimental work determined and supplied to the soil. Probably the outcome of continuous cropping in this State would be a necessity for some other manure than super-

phosphate. It had been demonstrated that certain crops (i.e., the legumes) such as peas, beans, &c., were instrumental in adding nitrogen to the soil, and this was a valuable plant food required by the wheat plant. Ploughing in these leguminous crops was a very effective way of adding nitrogen to the soil. The commercial fertilisers, which meant so much to the producers of this State, and indeed the whole world, added to the debt the practical farmer owed to the scientist. The writer then referred to the work of Farrer in wheat-breeding, and mentioned that by years of labor improvement in wheats had been made in color, size, and shape of grain. Wheats liable to shed the grain were made to hold it, and in a multitude of ways wheats were improved and rendered more suited to the conditions under which they had to be grown.

EUPHORBIA DRUMMONDII.—A weed was tabled by Mr. Barns, and afterwards forwarded to the department for identification. [The weed has been identified as *Euphorbia Drummondii*. Although this plant has undoubtedly been responsible for many deaths in large and small stock, it has appeared to be mostly amongst travelling stock and animals which were not used to it. There have been authentic cases where sheep have been fed on it regularly without any injury resulting.—Ed.]

Cummins, April 8.

PRESENT.—Messrs. Durdin (chair), Hall, Nosworthy, Scholz, Cooper, Hamilton, J. H. Durdin (Hon. Sec.), and two visitors.

BEST WHEATS FOR DISTRICT.—Mr. Hall read a short paper, in which he said that it was difficult in this new district to say with any degree of certainty which wheats were best; but for grain Federation seemed to do better than other varieties tried so far. Yandilla King was also a good wheat for both grain and hay, but unless sown moderately early had a tendency to germinate a little irregularly. In addition to these two wheats some early varieties could with advantage be sown, as the district was a wet one and fast-growing wheats did not suffer so much from cold and wet, while slow growers at times seemed to be at a standstill. The paper then continued—"Steinwedel and Newman's Early seem to give good results: the former is a little liable to bunt, but when you come to fill the bags Steinwedel is seldom far in the background. A neighbor informed me that his Newman's Early was free from takeall last season, whereas another variety sown immediately alongside under similar conditions was badly affected. This is a point worth remembering. The hay wheat Huguenot seems to thrive exceedingly well in this locality, and horses eat the chaff readily. I do not think it displaces the other good hay wheats entirely, because it is of little value for milling purposes; so the farmer will eventually be obliged to make it into hay regardless of what kind of a crop it may grow into. Nevertheless, while this wheat is so scarce it pays to reap it, as there is a fair demand for seed at a payable figure." A good discussion followed. Mr. Hamilton preferred Yandilla King to Federation because it grew much higher than the latter, and it was a more serviceable wheat for hay. Most members, however, were in favor of the early wheat. They also thought it paid better to sow oats for hay, as they grew better in this district. Mr. Nosworthy thought oats made better hay than wheat, and one was always sure of fair crop here.

Elbow Hill, April 8.

PRESENT.—Messrs. Cooper (chair), Dunn, P. and J. Rehn, H. P. and L. Wheeler, Chilman, and Wake (Hon. Sec.).

WHEAT-FARMING.—Several important phases of farm work were dealt with in the following paper by Mr. Chilman:—"Seeding is a most important work, and we should look a long way ahead to prepare for it. Secure a good haystack. Sixty tons of hay and about 50 bags of oats is sufficient to see a team of 12 horses safely through the year, and with that strength one can crop from 600 acres to 800 acres if the land is kept clean. This is done by having from 200 acres to 300 acres of fallow and about 200 acres of new land. As our living depends on our horses they should receive careful attention. They should be kept in a dry and warm stable, each in a separate stall. The horses should be groomed down every morning and the stalls cleaned out. With this treatment they are able to do a good day's work. As the rainfall in this district is somewhat limited we should make the best use of all that falls and study to conserve moisture. Begin sowing about the middle of March, on new land if the weather is dry. This enables one to get

a start on the fallow in the heart of the season, *i.e.*, from the middle of April till the middle of May. If the fallow is kept clean in the spring it should be worked back as lightly as possible after the first rain, with a 13-furrow twin plough; eight horses will work it comfortably. By giving the plough several days' start a 15-hoe drill may be kept going with a team of four horses. In this way it is possible to get in 20 acres a day. Only the best and well-cleaned seed should be used, and it should be changed from the hills to the flats every two years. Federation and Marshall's No. 3 should be sown first and Gluyas and Comeback last. Sow at the rate of 45lbs. of seed to the acre, and 40lbs. of superphosphate. I do not consider it necessary to pickle seed sown before the first rain. Fill in all the rabbit burrows and pick all stumps up ahead of the drill; this will more than pay for the labor in the wear and tear of the drill. After the wheat is drilled in go over the paddock with the fumigator and pump into the burrows that have been opened. Go around the fence occasionally and block up the runs. In this way it is an easy matter to keep the rabbits out of the wheat. I prefer the 3ft. 6in. netting around the boundary, as it can be trenched deeper, and there is no likelihood of the rabbits attempting to jump it." Considerable discussion followed. The majority of those present agreed that it was not necessary in this district to pickle seed wheat which was sown before the first rains fell. Pickling on the floor was thought to be the best method. Most other points touched upon in the paper were agreed with. Mr. Rehn thought 60 tons of hay was hardly sufficient for 12 horses for a year. The Hon. Secretary emphasized the importance of selecting good clean seed. His experience had been that seed infected with smut always produced some wheat affected with the disease. In regard to the rabbits the Chairman had found the poison cart about the most effective means of destruction. Other members favored the pump for introducing poisonous fumes into the burrows.

DRY BIBLE.—Members wished to know whether dry bible had ever been known to trouble working bullocks.

Merghiny, April 6.

PRESENT.—Messrs. Shorne (chair), Talbot, Mulrooney, Schwartz, Watson, Symonds, Webb (Acting Sec.), and one visitor.

HOMESTEAD MEETING.—Members met at the homestead of Mr. R. P. Symonds.

BUREAU WORK AND EFFECTIVENESS.—The Chairman drew members' attention to the fact that of 28 members on the roll only six were present. He considered the value of the Agricultural Bureau, especially in new districts, should stimulate members to better endeavor in making its work interesting and effective. After some discussion it was decided to hold the next meeting at the homestead of Mr. Shorne, and at that and subsequent gatherings to each bring a paper bearing on a question which it was desired to have answered. Any questions which could not be answered by other members straight away, to be made the subject of a paper for meetings of later dates. Refreshments were kindly provided by Mrs. Symonds, who was thanked for receiving the Branch, and the meeting then closed.

Miltalie, April 8.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. J. S. Jacobs (chair), F. and B. Jacobs, J. P., G. W., J. W., and E. Storey, J. A. and M. J. Laffin, Ramsey, Alm, Smith, Kobelt, Wilson, Hier (Hon. Sec.), and one visitor.

IMPROVEMENTS IN FARM IMPLEMENTS AND MACHINERY.—The Hon. Secretary read a paper in which was traced the wonderful development of machinery and implements used in rural pursuits. He then spoke of the special work which could be done with the more up-to-date appliances. Disc implements, he said, were especially valuable on land that had a tendency to drift, as with them the stubble could be satisfactorily worked in. It would be no easy matter to apply manures to the soil without the seed drill. Modern harrows were very valuable, under certain conditions, for harrowing after drilling. This operation gave best results in this district if done before the crop was up. He then contrasted work done by means of the reaper and binder, motor engines, adjustable chaffcutters, modern strippers, winnowers, and harvesters, and the means which previously had to be used to do the work now so much more easily accomplished. He also spoke very highly of the "Perkins" bag-loader. All these improvements had helped to bring under cultivation large areas which otherwise could not have been profitably worked. A good discussion followed. Mr. G. Story was in favor of harrowing growing crops just after they

started to stool. He instanced a crop at Cleve which had yielded 30bush. per acre. Mr. Alm thought the judicious use of the harrows was very beneficial to the crop. The cocktail harrow on the drill was effective in covering the seed. Other speakers mentioned numerous other improvements made in agricultural plant. Mr. J. P. Story thought the more recently improved machinery was not made strong enough for rough country. He was not in favor of machinery with too wide a sweep or cut.

DRILLING IN MANURE AND BROADCASTING SEED.—Some discussion took place regarding the practice of drilling in manure early and broadcasting the seed when suitable conditions prevailed, in order to get a larger area in quickly. Instances were quoted in which this had been successful, but most members preferred to drill the seed and manure in together.

DISC PLOUGHS.—Some discussion took place as to the best class of plough for this district. Several speakers advocated the use of the disc plough for the reason that with it stubble could be ploughed in. It was considered by Mr. Smith that it was advisable to plough in stubble in some classes of wet country, but that it would be unwise to do so in dry country. Others thought it safe to plough in stubble when fallowing, but not when ploughing for cropping, unless in a very wet season.

Mitchell, April 15.

PRESENT.—Messrs. D. Green (chair), Noss, J., P., and O. Green, McCormack, Sampson, Brice, Molloy, Dorward (Hon. Sec.), and four visitors.

BLACKSMITHING ON THE FARM.—Mr. Sampson read a paper setting forth the advantages to be derived from the establishment of a blacksmith's shop in conjunction with the farm. He considered this almost as necessary as a binder or harvester. Breakages were bound to occur, and unless the appliances were available to effect repairs promptly loss must result to the farmer. After a little practice the average farmer would be able to adjust casual disorders in implements and machinery very creditably and satisfactorily. He preferred the portable fan blast, and would build a suitable place for the forge. Considerable care was necessary to make both pieces of iron which had to be welded, exactly the same temperature. When the right temperature was reached, if the two pieces were brought into contact there would be a tendency for them to stick, and this indicated the right heat for welding. A comparatively slow fire was necessary to heat the iron right through. Members agreed that it was very necessary to have blacksmithing appliances on farms which were situated some distance from a blacksmith.

Penong, April 8.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Grad (chair), Lovell, Prider, Kreig, Stiggants, Wold, Roberts, G. H., J. B., and J. Oats (Hon. Sec.), and two visitors.

FEEDING FARM HORSES.—This subject was dealt with by short papers as follows:—Mr. Stiggants thought it best to give farm horses two short feeds and two feeds of hay per day. He gave two sheaves of hay for the evening meal and three for the night for each horse. Oaten chaff was to be preferred if available; otherwise wheaten chaff and crushed wheat four double handfuls damped with molasses. Oats should be fed with either of these rations at the rate of five double handfuls per horse. If the hay crop failed, and in the summer there was insufficient hay or chaff for the young stock, some straw should be raked up with a horsesrake and a quantity thrown to the horses and cattle from time to time. Oaten straw was suitable for horses, but not for cattle. Horses should have salt in their feed if the drinking water was fresh. Mr. E. Wold said that horses should be fed and watered regularly, and it was best to give water before the feed. Feed should be quite clean and free from dust and sand; clean water was important. Oaten hay, cut when half ripe, was best for horses when not working. During seeding he fed the horses on cocky chaff and boiled wheat for breakfast, dry wheat for dinner, and crushed wheat, bran, and molasses at night. The more bran they could get the better. On no account should musty hay be fed to horses. A stack or two of straw in the horse paddocks provided a picking and some shelter for winter nights. Young horses should be well fed till they were fit for work. Corn and care given at this time was well repaid later on. Mr. J. B. Oats said a little hay should be chuffed to feed with the cocky chaff. This with bran and crushed wheat made a very fair feed for horses. Long hay was best at night, and each horse should be able to get his share. Mangers should be divided up to

ensure this being possible. Mr. J. Oats said that where hay chaff was scarce he would mix two bags of wheat or cocky chaff with one or more bags of hay chaff. To this feed he would add about one quart of boiled wheat and similar quantities of crushed wheat and bran to each horse. This would constitute breakfast and dinner, and long hay would be fed at night. If the breakfast meal was mixed over night it would become softened by morning and would be cleaned up well by the horses. It was a mistake to put in too much chaff, as if left the corn was wasted. It was best to feed each horse separately. At most there should not be more than two to a box. Feed should be given under shelter, and a change of feed should be made when possible. A good paddock should be kept to turn out a horse or two when desired. Considerable discussion followed the reading of these papers. The Chairman said six horses well fed were of more use than eight ill fed. Hay chaff was best for day feeds, but he preferred to give long hay at night. As hay chaff was scarce in this district most farmers had to use wheaten or cocky chaff. The question then was what to mix with it. Molasses, a little pollard, bran in fair quantity, and a limited supply of oats should be used with this chaff. Cows needed similar rations if they were to give much milk. Mr. Roberts said that if the feed was damped more wheat could be given than if fed dry. Large horses needed more than small ones. He usually gave about one and a half pints of dry wheat per horse. Mr. Wold thought it unwise to give horses dry wheat more than twice a day. He gave two double handfuls and four of bran to each horse, and molasses 1 gall. to 8 galls. of water. Mr. Prider used dry molasses fodder. Mr. Lovell would not give long hay more than once a day. A tired horse should have short feed. Oaten hay, cut when nearly ripe, was better food than green wheaten hay. Members generally agreed that oaten chaff was superior to wheaten chaff.

Shannon, April 8.

PRESENT.—Messrs. Proctor (chair), F. and H. Proctor, J. and S. Carey, L. B. and E. B. Smith, G. and V. Gordon, Davies, Hahner, Glover, M. Cronin, J. J. Cronin (Hon. Sec.), and six visitors.

CARE OF FARM HARNESS.—The following paper on this subject was read by Mr. M. Cronin:—"Harness is a very expensive item, and calls for careful treatment. It should always be hung up secure from the weather when not in use. About 50 per cent. of it is knocked out, not worn out. Harness should be thoroughly overhauled at least four times a year and have any breakages repaired, either by the owner or the local saddler. All harness should be treated to a good dressing of some preservative twice a year or more. It is a good plan to do it before seeding and before harvesting. Several dressings serve the purpose. Mutton fat, neatsfoot oil, and resin is perhaps the best mixture for this district. Mix two parts of fat, one of oil, and one of resin, and apply to the harness when hot. Neatsfoot oil alone rots the stitching, but resin to a certain extent prevents this. The high price of new harness calls for more care than is usually given in a new country." Considerable discussion took place, in which members were agreed that harness should receive every care and be kept in repair. One member thought oiling once a year was enough, but others thought it should be done at least twice in the 12 months.

Utera Plains, April 8.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Gale (chair), A. and C. Venning, R. and H. Hornhardt, Stephens, Cahse, Holmes, J. and M. Abrook, Sinclair, Hill, Naughton, Guidera, Ramsey (Hon. Sec.), and six visitors.

DISC IMPLEMENTS.—The following practical paper was read by Mr. Hill:—"I have used a disc cultivator for some time, and it is a very valuable implement. It will pass through a fairly thick coat of straw, and will cut hard ground without leaving any ridges if it is properly adjusted. It is not a heavy implement to draw, but it passes over almost any obstacle without the slightest trouble. It is much better than the bridge plough and cultivator in stumpy and stony land. It throws all the earth one way, and leaves an excellent seed bed. My opinion is that these are the coming implements for this class of land. I have examined almost every make of disc cultivator on the market, and consider the Triumph and the Sun the two best suited to this district. There is a vast difference between these two makes. The Triumph is constructed on the long paring-plough principle, and is made of rather light material; consequently owners

complain of the bodies bending. There is a separate body for each disc. The discs are set with the bottoms dished forward, and each disc throws the earth on to the box of the one in front of it. This I consider a bad feature, as the boxes are not dust-proof and when the grit gets into them the bearings soon cut out and involve the owner in avoidable expense. These cultivators are sold at a cash price of £44 for 10 discs. The Sun has rather an uncommon shape, and it is constructed of very strong material. It is carried on three low wheels with very wide tires. The discs are set straight up and are set at an angle to the plane of the wheels. They are constructed on the twin principle, so that two discs run on one box, and both rise when one strikes an obstacle. Some farmers dislike an implement with that style of jumper; but there is not so much ground missed as may be thought when they jump a stump, because their furrows are much narrower than those of a plough. One of the main facts about the twin style is that all the boxes are dust-proof, and the wear is only half that of the others, and there are only half as many things to keep in repair. The wheels are made low to procure strength. It is thought by some that low wheels cause heavy draught, but in spite of this opinion disc implements are noted for their lightness of draught. The price for the Sun twin disc cultivator is £36 cash for 10 discs. I consider the Sun the best cultivator for this district, because it is the strongest in construction and most durable." Those members who had had little or no practical experience with disc implements were somewhat condemnatory in their remarks concerning them; but all those who were able to speak from their own experience were in favor of this class of implement for conditions met with in this district. In new mallee country where stubble was too thin to be burned the disc implements worked it without difficulty, and it was said that if they were set properly and worked correctly they would cut and scrape off nearly all the mallee shoots. This was a very important consideration.

Yadnarie, April 8.

PRESENT.—Messrs. Schubert (chair), J. A. and E. Kruger, Marston, G. A., C., and J. Dreckow, Weiss, Stubing, F. W. and A. Jericho, Spriggs, Mowat, Brown, R. B. and J. J. Deer (Hon. Sec.), and five visitors.

THOROUGH CULTIVATION.—A short paper on "Soil Cultivation" was read by Mr. Brown. Although his own experience of this district only dated back two years he had been told by older settlers that dry seasons had been experienced in these parts. Members should, therefore, endeavor to grip the principles of soil culture in dry areas, so that when comparatively dry years returned they would be able to make the most of what rain they had. In dry districts the soil should be broken up so that what rain fell would not run off, but would easily penetrate. Thorough cultivation must be practised, and the surface must be kept loose to retard evaporation. Where the soil was shallow, however, or where the subsoil was very inferior, deep ploughing could not be practised; but there was usually an area on each farm where the soil was naturally deep, and there it could be ploughed deeply. Each farmer had to decide the best depth to plough his own soils, according to their nature and depth. Members generally agreed, and said that shallow soils should only be lightly ploughed.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, March 17.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Hill (chair), Bone, Venning, T. and A. H. Fidge, Wall (Hon. Sec.), and four visitors.

PIG-RAISING.—A paper on "Pig-raising," to the following effect, was supplied by Mr. Leirsch:—In his experience a good breed of pigs well looked after was a paying proposition. It was best to get one good breed and stick to it. He preferred the Berkshire, as it required less feed than most other breeds, and always had a better appearance on a given quantity of feed. The weaners also brought better prices than others. He advised netting two or

three small paddocks and sowing barley and lucerne together early in the season. With this excellent grazing and a little offal pigs could be reared with little expense. For topping up a grain ration of about 2lbs. per day gave very good results. Plenty of clean water for drinking, as well as a supply for wallowing, should be put in convenient places, and good warm pigsties should be provided.

WHEATS FOR DISTRICT.—After some little discussion members agreed that for this district the best varieties of wheat were Club Head, Dart's Imperial, and White Tuscan.

Geranium, April 16.

PRESENT.—Messrs. Mitchell (chair), F. and W. Hammond, W. Mitchell, Long, Bowden, Blatchford, Pannell (Hon. Sec.), and five visitors.

HOW TO DEAL WITH BURNT SCRUB.—This subject was introduced by the chairman for discussion. Fire was a good servant, he said, but a most expensive master, and a man who had a block of land under "black sticks" was handicapped fully two years compared with the owner of green scrub which could be rolled, and then fired clean in one operation. To clean burnt scrub the land had to be gone over three or four times—first rolling; then raking into rows; then burning the rows, and eventually fallowing, for which operation he favored above all other implements the McKay's sun twin disc cultivator. These cultivators he thought were the best on the market, and paid for themselves in a couple of seasons by the number of shoots they cut, which was estimated at fully 75 per cent. Even after clearing the same good results were not obtainable from this burnt scrub land as from land where a good fire had burnt up all the sour undergrowth, leaving the land bare to the sweetening action of the sun. Members thought it advisable to burn this dead scrub as early as possible, giving the sun as long as possible to sweeten the soil. It was stated that the wood ashes were not so much a plant food, but the fire killed certain bacteria which were of an injurious character. Stump-jump ploughs were preferred by some members to discs, as they pulled up more stumps, thus clearing the land once for all; but against this, it was contended, an immense amount of work was necessary to cart away the stumps before drilling. A stump that was killed by disc ploughing and stubble-burning, and allowed to remain in the ground rotted very quickly on being attacked by white ants which swarmed in this country, and so it added to the fertility of the soil. It was noticeable that splendid growth was made by wheat around rotten stumps compared with the more open and consequently colder root beds.

SEEDING.—Several members reported having started seeding and one or two had early wheat up. Federation was again a strong favorite, being a particularly good stripper. Yandilla and Silver King were favored for either wheat or hay. Golden Drop, Bluey, and Glynas would also be sown.

Mannum, March 25.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. Faehrmann (chair), Haby, Wilhelm, Preiss, Schulze, Mann, Lenger, and Schuetze (Hon. Sec.).

RABBITS AND PADDY MELLONS.—Mr. Wilhelm read a paper on "Rabbit Destruction," in which he said he had been using strychnine and wheat after a formula supplied by the Surveyor-General many years ago. Some of the rabbits were killed by the poison and others seemed unharmed. This fact caused him to consider several questions, viz.—(1) Will rabbits recover if they take an overdose of the poisoned wheat? (2) Are there plants available to the rabbits which act as an antidote? (3) And does some plant render the rabbits that eat it immune to the strychnine? He was very much inclined to think that the last was the case, and believed that the paddy melon was the plant. Mr. Wilhelm then said that some of the symptoms of strychnine poisoning were similar to those of poison by paddy melon, and his inference was that the rabbits might take the paddy melon in small quantities until they were practically proof against it and similar poisons. He hoped the matter would be fully investigated and the results made known. He then spoke of losses of farm stock he had sustained through the animals eating paddy melons. [The experience of the Department with the "paddy melon" gives no reason to suppose that there are grounds for the inference drawn in regard to its causing immunity from strychnine poison.—Ed.]

Monteith, March 11.

PRESENT.—Messrs. Magor (chair), Eldridge, Bidjarand, McAskil, Wyld, Rowan, Male, Carter, Connell, Travers, Gardner, Nancarrow, Clark, Bradford, Murphy, Gregory, Heithersay, Martin, Hannaford, Gunn (Hon. Sec.), and nine visitors.

DAIRYING.—The following paper on "Dairying" was read by Mr. Travers:—"In starting a dairy farm I would recommend pure-bred stock, as they always command a better selling price than crossbreds. The breed to procure depends on the locality in which they are kept. Where they are grazed on an abundant pasture, with plenty of land to roam over, the milking strain of Shorthorn is a good all-round cow. The Ayrshire is hard-footed, active, and will stand either hot or cold weather well, and is an excellent milker. For local conditions the Jersey is by far the best. It is quieter to hand-feed, content in a small paddock, will consume less food, will give a higher percentage of butter fat in the milk, and, though not so heavy a milker, will keep longer in milk than other breeds. All milk should be weighed and tested by the Babcock tester, and the unprofitable cows should be disposed of. Breed only from the best cows. The cows should be grazed as much as possible. For winter feed a small paddock of prairie grass, Italian rye grass, and red clover should be sown as a mixture. For the spring a paddock of perennial rye grass and New Zealand cow grass should be sown, and for summer a plot of lucerne." A good discussion followed. Mr. Carter said that while it was acknowledged that the Jersey gave a larger percentage of butter fat, he thought the crossbreds were more robust. Mr. Connell favored the Jersey-Shorthorn cross. Mr. Rowan liked to have heifers come in at 2 years old. He then milked them right up to within a few weeks of calving. Most of the members favored keeping heifers until they came in the second time before any culling was done.

Monteith, April 15.

PRESENT.—Messrs. Heithersay (chair), Rowan, Travers, Blake, Connell, McAskil, Wells, Bradford, Murphy, Jacobs, Smith, Mountstephen, Bell, Gregory, Gunn (Hon. Sec.), and 10 visitors.

TREATMENT OF CREAM.—An interesting paper on the "Treatment of Cream" was read by Mr. Rowan. Cream was even more susceptible to contamination than milk, he said, and therefore required the greatest care in handling. It should be cooled as quickly as possible after separating and allowed to ripen properly before churning if the best butter was to be made. A good aroma in butter and freedom from bad flavor could only be secured by observing the strictest cleanliness in milking, in the yards, the utensils used for the milk or cream, and the place where the milk or cream were stored. Other important factors were, freedom from objectionable odors in and around the dairy, the skilled treatment of milk or cream before it reached the factory, and the provision of pure drinking water for the cows. Finally, Mr. Rowan spoke of the large number of unproductive cows kept by some dairymen in this State, and strongly advocated thorough testing to eliminate these from the herds.

POTATOES.—Some splendid "Up-to-Date" potatoes were tabled by Mr. A. Wells. These had been grown on the high land.

Parrakle, April 8.

PRESENT.—Messrs. F. J. Dayman (chair), Beelitz, Schmidt, Diener, Threadgold, Heinzel, Gravestocks, J. Dayman, Morrison, Hameister, Hall (Actg. Sec.), and one visitor.

PICKLING SEED WHEAT.—Some discussion took place concerning methods of pickling wheat. Mr. Schmidt preferred to do the work on a floor, turning the seed well, with a shovel. He had found the bluestone pickle more effective than fungusine in preventing bunt, but the bluestone killed a larger percentage of wheat. It was best to pickle the seed the night before sowing. The chairman pointed out that only when plots were sown side by side under similar conditions could the respective merits of pickling solutions be determined. Comparing the results of the use of one preparation one year with a different solution the following year was not an exact method, as the season had a great deal to do with the prevalence or otherwise of bunt. He was in favor of bluestone used the night before sowing. Mr. Gravestocks thought many farmers did not use a strong enough pickling solution. Mr. Diener preferred to immerse the grain in a cask of solution and would pickle the seed a week before sowing.

WHEAT DISEASE.—The chairman reported that a quantity of wheat had died off on the side of the sandhills on his property just as the grain was beginning to form. He asked the reason, but members were unable to suggest any cause other than weather conditions. [In cases of this sort it is always wise to send a few of the affected plants to the Department, as an investigation may be of some value and throw some light on the trouble.—ED.]

BEST WHEATS FOR DISTRICT.—Mr. Morrison was of opinion that Buds, Dart's Imperial, and Golden Drop were among the varieties most suited to this district; the lastnamed should be sown early. Members generally agreed that Yandilla King, Marshall's No. 3, Federation, Buds, and Bluey were about the best for this locality. Mr. Beelitz spoke of the wisdom of putting in about four reliable varieties, some early and some late, as the season usually specially favored one or more of these and returned a good yield.

OATS.—Mr. Morrison wished to know which was the best time to sow oats. Last year he sowed early and had a poor crop. He thought New Zealand Cape oats were good for hay. Mr. F. J. Dayman had had better returns from oats sown the last week in June than from those sown in the second week in May. They made a more rapid growth. Mr. Beelitz thought if oats were sown late the frost would check their growth. He considered the middle of April was a good time to sow, and liked Algerian for hay and white oats for grain. Mr. Diener said farmers should clean all seed a second time. Members agreed that it was necessary to do this.

Wilkawatt, March 20.

PRESENT.—Messrs. W. J. Bowman (chair), D. F. and D. Bowman, Ahrens, Altus, Sorrell, Brooker, Tylor, Neville, O'Shea, Schulze, Harvey (Hon. Sec.), and one visitor.

MIXED FARMING.—A paper on mixed farming was read by Mr. D. F. Bowman. Wheat-growing alone, he said, was a rather uncertain source of income. Enemies, such as takrall, red rust, and hot winds, together with uncertain falls of rain, rendered it impossible for the farmer to judge his return until the grain was safe in the barn. It was therefore wise to continue other lines with wheat-growing. The average farmer in this district should keep six to eight cows, should purchase a separator, and send the cream to Adelaide. If five cows were in milk, the return should be not less than £1 per week from this source. Pig-raising could be profitably engaged in where skim milk was available. At three to four months old the pigs should be fattened with wheat and sold. Most farms could very well carry 100 head of good fowl. Each year new chicks should be hatched and old birds killed off or sold. Milk was a splendid food for laying hens. The farmer who kept cows, pigs, and poultry as described, would always be in a secure position in spite of a poor wheat crop. Members discussed the suggestions made in the paper and agreed that it was very wise to combine these side lines with wheat-growing.

THE WEST COAST.—A short paper, giving an interesting description of his trip to the West Coast, was read by Mr. Altus and much appreciated by those present.

Wilkawatt, April 6.

PRESENT.—Messrs. W. J. Bowman (chair), D. Bowman, T. and H. C. Sorrell, H. and O. Ahrens, H. and E. Brooker, J. and J. E. Altus, J. and A. Ivett, Gregurke, Tylor, Schulze, Hayes, Harvey (Hon. Sec.), and six visitors.

VETERINARY APPLIANCES FOR MEMBERS' USE.—Following on a discussion respecting the need for a veterinary handbook and appliances for use in cases of emergency, it was decided to procure a good veterinary work and medicine chest for the use of members of this Branch.

FIELD TRIAL.—During the afternoon a field trial of implements was held in Messrs. Brooker Bros.' paddock. The verdict of the judges was that there was only a small margin of difference between the various implements. The skim plough was judged to be the best implement for killing weeds.

MARKETING WHEAT.—Some discussion on marketing wheat took place. Mr. Altus considered that wheatbuyers should be compelled to take the farmers' weights instead of *vice versa*. Some members thought wheat should be weighed in bulk on a weighbridge, and considered this method would result in a good many more bags of wheat being credited to the seller. A vote on this subject resulted in a majority in favor of the bulk-weighing of wheat.

SOUTH AND HILLS DISTRICT.**Cherry Gardens, April 11.**

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. Chapman (chair), T. and A. Jacobs, J. and C. Lewis, Mildwater, Hicks, Ricks, Stone, Curnow (Hon. Sec.), and two visitors.

FARM LABOR.—A paper dealing with the question of farm labor was read by Mr. Stone. The general prosperity of recent years, he said, had given an impetus to various industries, and men consequently had regular employment with shorter hours of labor than those workers engaged in rural pursuits. A return of less prosperous seasons would alter this aspect of the case. The farm hand needed to-day had to be little short of a mechanic. Possibly some of the immigrants brought to this country could be given an opportunity by the Government to learn the working and management of the more common farm implements and machinery. The Hon. Secretary thought that so long as work was plentiful, and especially around the larger centres of population, men would not tramp through the country to get work of only an intermittent nature. Naturally they preferred constant work at the maximum amount of pay. Mr. Ricks said that there were plenty of men willing to work on the farms under fair conditions. The time had gone when men would sleep in a hovel and work for a mere pittance. Let the farmer pay a living wage and treat his men well and there would be no scarcity of farm workers. Mr. Jacobs pointed out that the present rate of wage was above the standard that the farmer could afford to pay, as he had to compete in the world's market for the sale of his produce.

Clarendon, April 20.

(Average annual rainfall, 33½in.)

PRESENT.—Messrs. Matthews (chair), Piggott, J. L. and C. Spencer, A., H. C., A. A., and E. Harper, Wright, Brooks, Hilton, Giles, Morphet, and Phelps (Hon. Sec.).

SHEEP-BREEDING.—The Chairman gave an interesting address on sheep-breeding. He recommended the pure Merino ewe and the Leicester ram as the foundation of the flock. A large variety of wool of different classes was exhibited, and many questions were satisfactorily answered.

Forest Range, April 13.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. McLaren (chair), J. A. and E. Green, E. and F. Rowley, Collins, and Monks (Hon. Sec.).

GARDENS FOR FARMERS.—The Hon. Secretary read a paper in criticism of one under this title which was printed on page 630 of the January, 1911, issue of the *Journal*. He said that fruitgrowers of necessity had to buy the farmer's wheat products and other articles of food produced in farms on various districts. Many fruitgrowers refrained from keeping cows, pigs, and poultry, to help the farmer by purchasing butter, bacon, and eggs. He could sympathise with farmers who were far removed from centres where fresh fruit could be obtained, but thought that the farmers of the State generally did not help the fruitgrowers as they might by purchasing not only fresh, but dried and canned fruits and jams. It was evident that a better system of distribution was needed for fruit. Co-operation was one means whereby this matter might be put on a satisfactory basis, but the growers would need to be absolutely loyal if success was to be attained. In the discussion which followed, the general opinion seemed to be that it was only reasonable that farmers should grow fruit for their own use. At the same time members considered that the farmers should become larger consumers of dried and canned fruits, and should be sufficiently patriotic to purchase South Australian made jams in preference to imported brands.

Gumeracha, April 11.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Porter (chair), Moore, Randell, Cornish, and Lee (Hon. Sec.).

DRAINING WET SOILS.—A short paper on this subject was read by Mr. Cornish. A good deal of land in this district, he said, needed to be well drained before it would grow

any marketable crop satisfactorily. As stone was available, he thought this would be the best material to use. Springs should be carefully noted and marked, and the drains put in the proper position. If stone could not be procured, timber could be used, but not green and sappy timber, as this rotted too easily. Considerable discussion followed. Mr. Randell had been successful with open drains. Mr. Moore advocated green poles for the construction of drains. Stones were usually too expensive to use. He had a pole drain which had been in use for 60 years. These were constructed by digging the drain to the required depth and laying in six or seven poles. These were covered with leaves and then the lower earth was replaced and the top soil put on the top again. It was not advisable to ram the soil in in any way. He thought the local flats could be drained by using a subsoil plough to a depth of 18in. Mr. Porter thought surface drains were not effective in this district. Pole drains were best; stone ones were liable to become choked.

Hartley, April 11.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Fydeinan (chair), W. and C. Brook, Hudd, Pratt, Symonds, Wunder-sitz, Clark, G. and T. Phillips, and Bermingham (Hon. Sec.).

THOROUGH CULTIVATION.—Some discussion took place relative to thorough cultivation being a condition of success in wheat-growing. Members agreed that some of the slipshod methods of the past would not do. They considered the soil should be well worked and cleared of weeds before seeding commenced. It was estimated that the average cost of wheat production in this district was about 23s. per acre for fallow land and 12s. per acre for grass land. Members were unanimous in the opinion that the fallow paid best. [Has allowance for rent been included in these figures?—ED.]

SORE SHOULDERS.—In reply to a question as to causes of sore shoulders among horses, it was said that too much corn in the feed would cause this trouble. This should be fed in small quantities at the commencement of the season and gradually increased until the full ration was reached. Badly fitting collars were another cause of sore shoulders. Frequently the collars were too wide. They should be well greased and cleaned. A bran bag placed under a collar was a means of preventing sore shoulders, inasmuch as it absorbed the perspiration.

Kanmantoo, April 8.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Lewis (chair), J. and W. Downing, W. G. and W. Mills (Hon. Sec.), and 12 visitors.

BUREAU WORK AND EFFECTIVENESS.—The following practical paper on this subject was read by Mr. W. G. Mills:—"After some 20 years we have seen fit to change the meeting place of this Branch of the Bureau to Bondleigh, and I feel sure that the removal will be beneficial, especially as so many young men are coming forward. They will shortly be the men of the day, and it is a good sign that they are ready and willing to take part in any movement for their own advancement or for the advancement of their district. After 20 years of Bureau work, although I have not worked in it as hard as I might have done, I feel able to say something to give you an idea as to whether 'the game is worth the candle.' Let us take a simile. You have all spent several of your younger years at school, have had a good time in the playground, and, possibly, a bad time occasionally in the schoolroom; all learned something, if not as much as might have been. Now, do you think that time was wasted? Would you be without the memories of the old schoolground? Do you think you would be as happy or as able men if you had never seen a school, and could neither read nor write? Well, our Branch Bureau, I consider, should be something like the old school—a place to learn something, if only a little, and also to have a bit of fun sometimes. There is so much to learn, and we older fellows are getting lazy, and our brains and bodies dull and slow, or, perhaps, so full that they cannot hold any more. By coming together and comparing our ideas we can see where any other man's method is better than our own, and we shall profit thereby if we are wise. These meetings also stimulate the Bureau member to strive to put his ideas into correct words, and this makes a sharper and more correct man of him. He will find that power of great use many times throughout his life. Further, this assembling together and discussing topics of general interest is going to pave the way for many future movements, such as co-operation in large undertakings, not possible to one or two, but easy to a number

who will pull together. We, of the older generation of producers, apparently each thought himself almost the only man in the world worth thinking of, and about the only man who knew anything worth knowing. So it has been impossible to do much by way of co-operation. I know men who would neither learn from anyone else, nor let anyone know how they worked things themselves if they could help it. Moderation in all things! Do not push opinions down other people's throats, but be ready to compare notes and experiments and learn one from another. The last word in grazing, farming, gardening, and all kindred pursuits will never be spoken, and the subjects that crop up seem to be inexhaustible. Take our own district for example—grazing is no doubt the chief industry, owing to the nature of the country. I think I could divide it into 20 different subjects for you to discuss, and when you had finished them I dare say another 20 would have cropped up. It is so with gardening, &c. Fifty years ago our sheep were all shepherded, and mostly yarded in high brush yards for the night. Now we have netted-in paddocks, and have beaten the wild dogs, scrub, and scab, and are in a fair way to do the same with both ticks and rabbits. But still we have flies and foxes to keep us busy. There are likely to be such problems as exhausted pastures, injurious weeds taking the place of our good grasses that have been killed through over-stocking, or continual feeding by the sheep. Will it pay us to change our stock, i.e., sheep, to cattle or horses, and, in some cases even pigs? or shall we rest our pastures for a year or two? These are a few typical questions, and if the young members have vigorous inquiring minds our Branch Bureau need never be in want of a subject of interest. Above all, attend each month with your notebook full of little things you have noticed, heard, or thought of for discussion. That will make you think. Ideas will be put into actions, which must eventually result in better work, and South Australia as a whole will reap the benefit. The State as a whole has been the richer for some time past owing to better returns from the land, but there is still plenty of room for improvement."

Kingscote, April 4.

(Average annual rainfall, 18½ in.)

PRESENT.—Messrs. Turner (chair), Bell, Wright, K. and W. Nash, Anderson, Chirgwin, Murray, Jacka, Barrett, Wood, Ewens, Castine, Cook (Hon. Sec.), and five visitors.

HOMESTEAD MEETING.—Members met at the homestead of Mr. F. W. Jacka.

TObACCO-GROWING.—Some discussion on growing tobacco took place. Members had been informed that farmers in Victoria were netting from £50 to £60 per acre from this crop, and that Kangaroo Island was a suitable place for the cultivation of the "fragrant weed." They were also advised to inspect the tobacco growing at the northern end of the Adelaide Botanic Garden.

EXHIBITS.—Mr. Nash tabled some splendid maize grown without irrigation. All the cobs were well filled. Also some excellent Mundic peaches of very large size and a Chou moellier about 6ft. high, carrying leaves 2ft. 6in. long. Members agreed that this was a splendid fodder for Kangaroo Island, and it could be grown without irrigation.

INSPECTION OF GARDEN.—The fruit garden was inspected by members, who also noticed in a fertile flat a crop of potatoes estimated to yield 5 tons per acre. Apples, walnuts, tomatoes, and similar vegetables were growing well. Orange and lemon trees were bearing fruit. A paddock which had been sown with lucerne was carrying a luxuriant crop of weeds, much to the disappointment of the owner, who had purchased the seed as "pure."

VETERINARY ADDRESS.—After lunch, which was kindly provided by the host and hostess, the Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) addressed the meeting on the question of hereditary unsoundness in stallions. Three horses were used to demonstrate the speaker's remarks, and the members followed with keen interest throughout. Many questions were put to and answered by Mr. McEachran. Two calves were castrated during the afternoon, and finally, at the close of the day, members pronounced this to be the most successful homestead meeting yet held.

Longwood, March 25.

(Average annual rainfall, 37½ in.)

PRESENT.—Messrs. Hughes (chair), Glyde, Oinn, Vogel, Doley, Nicholls, Blakley, Pritchard, Furniss, Roebuck, and Coles (Hon. Sec.).

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. Furniss. Members inspected the garden, and noticed that Rome Beautys and London Pippins out-

classed all other varieties of apples this season for excellence of fruit and size of crop. The latter variety was said to be gaining favor throughout the district as a consistent cropper, producing good fruit. Some fine crops of maize, holcus, melons, field swedes, and mangolds were also seen, as well as a recently installed petrol engine used for cutting chaff and wood. Tea, which was kindly provided by Mrs. Furniss, was partaken of and the business of the Branch transacted.

VISIT TO MYLOR TYPE ORCHARD.—As arranged at the above recorded meeting, members visited this orchard on April 1st, and were well pleased with what they saw. They considered this orchard was a good educational institution and well worth a visit.

Longwood, April 15.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes (chair), Doley, Nicholls, Furniss, Glyde, Oinn, Blakley, and Coles (Hon. Sec.).

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. Glyde, who entertained members to tea.

RENEWING AN OLD ORCHARD.—Mr. Oinn introduced this subject. He had found budding on old wood a failure. Although vigorous pruning both above and below the ground, along with judicious manuring and cultivation, would achieve great results, when trees began to die back and decay through age and neglect, the best plan was to plant afresh between them, and as the young ones come on grub out the old trees. The roots of the old trees would extend all through the ground, and if left would retard the growth of the young trees. The land between the old trees should therefore be deeply stirred, and the old roots severed and taken out as much as possible. Members thought it unprofitable to attempt to renovate an old orchard. If the land was required again for trees it was better to grub the old ones right out and leave the field for grass for a few years. Roots if cut and left in the ground would tend to send up numbers of suckers. Growers should therefore keep the orchard vigorous and healthy from the start by the judicious use of manure and proper cultivation.

Meadows, March 13.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. Ellis (chair), Brooks, Smith, Morriss, Kleemann, Nottage, and Bertram (Hon. Sec.).

CURRYCOMB v. BRUSH.—The Hon. Secretary read a short paper in which he deprecated the careless and frequent use of the currycomb on horses. He maintained that it should be seldom used, and then only lightly, and in the direction in which the hair lay. In the winter, when mud had caked on the coat, it was cruel in the extreme to drag it off with the currycomb, as it was bound to take a lot of hair with it. The ordinary stable-broom was very effective in removing mud from the coat. The hard teeth of the comb irritated the skin and caused more scurf than they removed. The main grooming should be done with the brush. A little regular brushing was better than a deal of reckless currying and much better for the horse's disposition.

Meningie, April 15.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Ayres (chair), Williams, Hill, Hiscock, T. W. R. and F. S. Taylor, Martin, Botten, Mincham, Tregilgas (Hon. Sec.), and one visitor.

COLT-BREAKING.—A short paper on this subject was read by Mr. Hill. To train a horse for the best work, or to realise a good price for him, great care was necessary in breaking in. It should not be overworked when young, nor should it be allowed to get sore shoulders. When 2½ years old a horse should be broken to all kinds of harness. Much patience was needed for the task, and it paid to devote all the time that was necessary to do the job properly.

Mount Pleasant, April 13.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Giles (chair), Royal, Phillis, Vigar, Thomson, Tapscott, Maxwell (Hon. Sec.), and two visitors.

FARMING IN SOUTH AUSTRALIA.—The Hon. Secretary read a paper in which he deprecated the use of so much labor-saving machinery on farms. This led to the population being centred in cities instead of on the land. It also became a difficult matter for men with limited capital to start farming, as the machinery and implements cost so much. He considered that farmers whose positions were secure should adopt a system of farming which would give employment to a larger number of men. More stock should be kept on the farms and a larger amount of produce raised, which could be used in the community. In the discussion which followed one member instanced some farms which were not cultivated in the way he considered they should be. Other speakers were unable to agree with the writer of the paper that modern farm machinery was more a bane than a blessing.

Port Elliot, April 15.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. Welch (chair), Green, Pannel, Chibnall, W. E. and W. W. Hargreaves (Hon. Sec.).

NITROGEN WANTED.—Members considered that the soils in this wet district were deficient in nitrogen, and they advocated growing and ploughing in peas and other leguminous crops to help furnish the plant food now lacking.

BUREAU WORK.—The Hon. Secretary read a paper on Bureau work. Having sketched his ideal Bureau system, which would embrace every producer in the land, he continued with the following very practical remarks:—"There are to-day a lot of Bureau Branches which hold very few meetings and the attendance is sometimes small. Analyse the list of members and they can be placed as follows:—First, the working member, who attends regularly and does his best to make the meetings interesting; second, the shy member, who has an enormous amount of information stored away, but is too shy to tell it to his fellow members. In the third place we have the indifferent and lazy member, who fails to take any practical interest in meetings. Every member should do his best, and tell his experiences, whether of success or failure. It is not an easy matter for a few, month after month, to fill up the programme. All can help if they will try. Some think it is beyond them to read a paper or bring forward a subject for discussion. Meet these men in the field and you will find that they have a store of good information. Then there are men brimming over with ideas of how things ought to be done. Let these men bring out their ideas and let the world test them. Then again we have the handy man on the farm, who has a knack of making contrivances that save time, labor, and expense. Let him bring those ideas to the meetings; in fact, anything and everything that will make the meetings interesting and instructive. Also bring specimens of plants, grubs, weeds, etc., which may be tabled for general inspection. Bring along any visitors who may be interested, and perhaps, if living in the district, they may become members. Some districts need railways, another a canal, others locking the river, &c., and we can get these only by proving the country to be worth it. To do this we must work in union. We cannot do much unless we all pull together." Members discussed the question freely, and stated that they had gained a deal of useful information and put into practice ideas which they would not have had but for their connection with the Agricultural Bureau and the *Journal of Agriculture*.

Uraidla and Summertown, April 3.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. Collins (chair), Curtis, Kessell, Day, Hart, Pappin, Hawke, Rowe, Johnson, Richardson, Moulds, Cobbledick, Willsmore, Dyer, and Snell (Hon. Sec.).

UTILISATION OF SPARE TIME.—A short paper under this heading was read by Mr. Hart. He said that there were many things on the garden and farm which could be attended to in odd moments and on wet days which would save valuable time when conditions were favorable to the execution of larger tasks. Among these odd jobs were the following:—Cleaning spray pumps and oil engines, mending hoes and ploughs and other implements, cutting bean sticks and firewood, making raspberry tins, grafting, clearing

round fences, mending culverts, &c., &c. Members agreed that these and similar jobs should be attended to whenever the ordinary work had for a while to be abandoned.

ANNUAL REPORT.—The Hon. Secretary reported that nine meetings had been held during the year, with an average attendance of 13. Papers on the following subjects had been read and considered:—"Turnip Culture," "Cherry Culture," "Spraying for Garden Pests," "Farm Produce," "Strawberry Culture," "Better Prices for Produce," "Bee-keeping," "Cultivation of Swede Turnips." In addition the following subjects had been discussed:—"Chaff Injurious to Stock," "Diseased Potatoes," "Strawberry Grub," "Pickling Seed Potato," "Paradise Stock for Apple Trees," "Best Apples to Plant," "Soluble Manures for Onions," "Gardens Inspection and Government Fruit Pulping Plant," and "Compulsory Standard Case."

SOUTH-EAST DISTRICT.

Kalangadoo, March 11.

PRESENT.—Messrs. D. W. Tucker (chair), S. Tucker, Rake, Earle, Boyce, Guerin, Bennett, Gibb, McDonald, Hemmings, and Sudholz (Hon. Sec.).

POTATOES FROM FIELD TO MARKET.—The following paper was read by Mr. Guerin:—"In this district it is very difficult to class out a good marketable sample of potatoes, principally on account of the different kinds of soils that are found in our fields. A grower must use judgment, and must select according to the variety he is digging. The Snowflake is probably the most difficult variety to class. The medium sized potatoes that would usually be considered too large for seed if mixed with the large ones are a shade too small and tend to spoil the sample. It is a much easier matter to get up a good sample from the following kinds—Redskin, Pleuter's, White Prolific, Peach-bloom, Pink-eye, and other round potatoes, even with smaller sized tubers. Be careful not to spoil the sample by adding too small a sized potato. These seconds are always valuable for seed purposes. If growers would observe this rule and plant these for seed instead of only the smallest of all, their crops would improve and produce a better potato. I have been growing potatoes in this district for the past ten years and have learned that it is a most important matter to fill the bags well. This not only makes them easier to handle, but it often prevents rubbing of early dug tubers. The sewing of the bags intended for distant markets is another item that should receive every attention. If the potatoes are exposed to wind and sun, they are sure to show a greening, and this interferes with the sale of good potatoes. Second-hand bags should not be used for potatoes intended for the Adelaide market. These bags will not usually stand the bag-hook, and with several breaks of gauge in the lines of South Australia the extra handling necessitates the use of new bags. A dealer in Adelaide may purchase your potatoes for Broken Hill, Port Pirie, or West Australia, and if they are in poor bags he cannot export them. Potatoes therefore always sell better in a new clean bag." Discussion followed, members agreeing that it paid to devote time and care to the preparation of potatoes for market, as suggested in the paper.

EXHIBITS.—Mr. Earle tabled samples of potatoes (Pleuter's) showing the second growth. The samples were a good shape, and large. The second growths were the size of hen eggs, fixed on to the eyes of the larger potatoes. Maize 9ft. high was tabled by the Hon. Secretary. It had grown without any care or attention since planting.

Keith, April 20.

PRESENT.—Messrs. Lock (chair), Lambert, Fulwood, Morcom, Leishman, Dall (Hon. Sec.), and one visitor.

LUCERNE-GROWING.—An interesting paper on "Lucerne-growing" was read by the Chairman. Having mentioned the centuries and countries in which this plant had been used as a fodder, the paper proceeded as follows:—"Land for successful lucerne-growing must possess a good drainage. The nature of the soil does not matter much, provided it does not contain too high a percentage of clay or alkali. The area should be fallowed at least three months before sowing, the weeds killed, and the soil well worked up with

a scarifier or disc harrow. It should also be rolled when ready for the seed. I would recommend from 3lbs. to 5lbs. of seed to the acre under ordinary circumstances. If sowing for irrigation put in a little more, but it is better not to put too much seed in this district. Harrow lightly or brush the seed in and again roll the land well. On well-worked fallow April or May sowing is the best. The seed gets a fair start, while the ordinary winter rains maintain a good root growth, and the plant is placed beyond danger from a dry October if such be experienced. In our district, where crops are subject to heavy frosts, a nurse crop of barley or wheat, sown at the rate of not more than three-quarters of a bushel per acre, is often a necessity. By the way, it is a good plan to sow a little lucerne seed with the wheat crop at the rate of a pound or two to the acre for feed in the stubble. The seed can be mixed in the manure, but care must be taken not to put it in till you are ready to sow, or germination may be interfered with. If the seed is well mixed with the manure it will be sown fairly evenly. For spring sowing of lucerne the land should be ploughed early in the winter to permit the sun, rain, and frost to properly weather the soil. Sow as early in September as possible to allow the young plants to become established before the heat of the summer. No nurse crop is necessary or desirable with spring sowing. I recommend lucerne-growers to purchase, if possible, guaranteed true South Australian or Hunter River seed. Again, only sow on well-drained soil. Irrigated lucerne plots should be well cultivated early in the winter and again in August or September.

"Harvesting the Crop."—There are two ways to harvest. One is to cut the fodder for the stack, either green or as hay. This method makes a good deal of work, and will only pay where heavy crops can be grown. It is therefore usually followed only where irrigation is practised. The other way is to feed it off. This, perhaps, is the better way for crops not irrigated. The right time to cut or feed is just when the plant is coming into flower. It should be fed off to the ground and the stock afterwards removed and the lucerne allowed to grow till it begins to flower again. It is a good plan to turn sheep in after the big stock to avoid any waste. The lucerne should not be fed off too often or the best results will not be secured. Lucerne does well in this district, and if properly looked after will be a very profitable fodder."

Kybybolite, March 9.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), Smith, Pettit, Koth, Duffield, Scholz, Kuhne, Birks, Lacey, G. H. and W. Hahn, Scott (Hon. Sec.), and nine visitors.

POULTRY-RAISING.—An address upon poultry-raising was delivered by Mr. D. F. Laurie, Government Poultry Expert, who dealt with breeding, feeding, and housing and other phases of this industry.

Millicent, March 28.

(Average annual rainfall, 28½in.)

PRESENT.—Messrs. H. F. L. Holzgrefe (chair), Mullins, Serle, Day, Oberlander, Mutton, and Hart.

GRASSES AND FRUITS.—Mr. Oberlander tabled a sample of Rhodes grass, 3ft. 6in. high, which had been grown from seed on a sandy soil. It was generally admired. Also showed some specimens of apples, known as the "Nickajack," which appeared to be a good market variety of eating apple. Mr. Serle showed some *Paspalum* grass grown on the ranges. It was considered that if this grass could be grown so well in such surroundings there should be no doubt about its success in the richer land on the flats. He also exhibited some very large tomatoes of the Acme variety, and some Flemish Beauty pears.

Mount Gambier, April 8.

(Average annual rainfall, 31½in.)

PRESENT.—Messrs. Sassanowsky (chair), Holloway, Mitchell, Keegan, Wedd, Wheeler, Watson, Smith, Major, Kennedy, Engelbrecht, Ruwoldt, Pritchard, Sutton, Kilsby, Pick, G. and D. Collins (Hon. Sec.).

CONFERENCE NOTES.—Following on the report of the recent Conference of South-East Branches, given by a delegate (Mr. Wheeler) and the Chairman, considerable discussion

took place. The Chairman said that the effectiveness of the local annual Conference was becoming less and less, and that if members of Branches did not put more heart into these gatherings they would fail to accomplish the purpose for which they were arranged. He could not agree with Mr. Summers that two central towns should be permanently fixed as meeting places for the Conference, as he considered this would lessen the interest among Bureau members of the more distant Branches. The agenda paper for the Conference should be so arranged that more time was devoted to addresses from officers of the department. The Chairman also said that the exhibits sent from Kybybolite to the recent Conference showed that the land in that locality would need to be well drained before it would give the best results.

EXPERIMENTAL FARM.—Mr. Engelbrecht spoke of the recently acquired Moorak land and suggested that the department would be well advised to establish an experimental farm there to demonstrate what could be done on small holdings with intense culture. The cultivation of tobacco, flax, sugar, beet, &c., as well as dairying on proper lines could be carried on as an example of what the settlers might do. It was decided to bring the matter before the Hon. Minister of Agriculture.

Naracoorte, March 11.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Coe (chair), Wright, Forster, Rogers, Caldwell, Tolmer, Williams, Langeludecke, Loller, and Schinkel (Hon. Sec.).

DEPTH OF SOWING.—Considerable discussion took place regarding the best depth to sow wheat. Nearly every member present spoke on the subject, and said that shallow sowing was best for this district. Some instances were quoted to show that if sown more than 2in. deep the germination was poor. It was stated that in the northern districts farmers sometimes drilled in the super. and then broadcasted the seed, with good results. It was also said that keeping the surface soil loose and open by means of the harrows was beneficial in many classes of soil in this locality. Finally a vote was taken, resulting in a large majority in favor of shallow seeding.

Naracoorte, April 8.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Coe (chair), Rogers, Loller, A. Langeludecke, sen and jun., Caldwell, and Schinkel (Hon. Sec.).

BEST TIME TO SOW OATS.—Mr. Rogers wished to know what was the best time to sow oats. Mr. Schinkel considered it best to sow oats for hay in the month of May, and feed them off. He believed in sowing early so as to let the crop get a good start. When they were fed off they got finer straw, and the plants stood better. Mr. Loller said that in a changeable climate like the South-East they had to be guided by circumstances of the season. He would be inclined to sow them at the end of April if the season were suitable, or the second week in April and feed off severely. Farmers had to be guided by circumstances, and they could not go on hard and fast lines. All things being favorable he believed in early sowing in order to give the crops a good start before the ground became cold. The Chairman favored putting in oats as early as possible; they made good feed for sheep.

Penola, April 1.

(Average annual rainfall, 26½in.)

PRESENT.—Messrs. Peake (chair), McDonald, Alexander, Wilson, McKay, Miller, Warner, Norman, and Adamson (Hon. Sec.).

STANDARD FRUIT CASE.—Having considered a letter from the Uraidla Branch, it was resolved that "This Branch approves of the standard fruit case being made compulsory for export purposes."

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

The Wool Expert.

Members of the Agricultural Bureau will learn with regret that Mr. Spencer Williams has resigned his position as Wool Expert. Mr. Williams was appointed to this position nearly two years ago on the resignation of Mr. W. J. Matthews, and has been very successful in his work. He has severed his connection with the School of Mines in order to accept the position of manager of a large local firm, and will therefore still remain in touch with the wool-producers of the State.

Treatment of Stock Diseases.

A series of articles dealing with the ailments and diseases of stock, and giving instruction in preventive and curative treatment, will be published in the ensuing numbers of the *Journal*. The first article will be contributed to the July issue by the Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.).

A Big Order for Cows.

The Tasmanian Government have communicated with the Stock Department of South Australia, stating that 500 dairy cows are required for King Island, in Bass's Strait, and asking at what price they can be purchased here f.o.b. The request has been referred by the Deputy Chief Inspector of Stock to the local stock agents, to see if they can supply the animals. Like the recent order from the Dutch Government for a number of milking Shorthorns for Java, this later demand is flattering to South Australia, as the island State has of recent years forbidden any importation of stock from the mainland.

Notifying Stock Diseases.

Stockowners throughout South Australia should remember that they are required by the Stock Diseases Act to report immediately to the Chief Inspector of Stock any actual or suspected cases of pleuro-pneumonia, tuberculosis, lumpy throat, or cancer in cattle, and any disease affecting swine. The notice must be given to the Chief Inspector either by letter or telegram. In the past

several cases have not been duly reported, and the result of such negligence may be very serious. As soon as the Chief Inspector of Stock receives notice of an outbreak he will refer the matter to the Government Veterinary Surgeon, but, unless the case is serious, stockowners cannot expect on every occasion the personal attendance of a veterinary officer. In communications to the Stock Department the symptoms and history of the disease should be given.

Russeting Caused by Bordeaux Mixture.

"In recent years there has developed a very serious objection to the use of Bordeaux mixture as a fungicide on apples, owing to the injurious effect it produces on both fruit and foliage," write Messrs. Scott and Roberts of the Indiana Department of Agriculture. "The skin of the young fruit is injured by the copper, and as the apple develops the injured portions enlarge, resulting in russet blotches and streaks. In wet seasons the russeting of the fruit is sometimes so serious as to reduce its market value 25 per cent., or in some cases even 50 per cent. The pathologists and apple-growers have, therefore, been driven to seek a less caustic fungicide, and the result has been the development of various lime-sulphur preparations. Concentrated lime-sulphur, to be diluted and used as a summer spray on apples, may be prepared as follows :—Boil 16lbs. sulphur and 8lbs. lime with 10galls. water for about an hour, finishing with 8galls. concentrated solution. Then strain and dilute it with water to make 200galls. spray. This makes 4lbs. sulphur in each 50galls. spray, which, in our experiments, has proved to be about the right strength for summer spraying of apples. It may be made in larger quantities by using 100lbs. sulphur and 50lbs. lime, and boiling them together with enough water to finish with 50galls. concentrated solution. The boiling may be done in a kettle over a fire, or in a barrel or other tank with steam. In diluting for summer spraying 2galls. of this solution should be used in 50galls. water. Used at this strength in our experiments it controlled apple scab, leaf spot, and cedar rust fully as well as Bordeaux without seriously injuring the fruit or foliage."

Changing Variety of Seed Wheat.

Many farmers make the mistake of sowing year after year a variety of wheat which yields several bushels less per acre under their conditions than some other variety would do under the same conditions. Often the only reason why a particular variety has become popular in certain localities is because when first introduced it gave an extra high yield, due more to exceptionally good treatment in a favorable season than high-yielding qualities

of the variety. When a new variety is introduced in a community or on a farm it should always be grown in the same field and beside a well-known or standard variety. It is difficult to determine the possibility of any variety when comparing a field on one end of the farm with another on the other end, or, what is still worse, comparing one man's field with that of his neighbor.—*Maryland Experiment Station.*

Farm Wages in U.S.A.

It is interesting to note that higher wages were paid to American farm laborers during 1910 than at any time in the last 45 years, according to statistics just made public by the Department of Agriculture. The average wage for the country was \$27.50 (£5 14s.) per month during 1910, while 20 years ago it was only \$18.93 (£3 18s. 8d.) With board, the average wage was \$19.21 (£3 19s. 10d., or 19s. 9d. per week). The highest was in Nevada, where the rate was \$54 (£11 5s.), while in Montana and Washington it was \$50. South Carolina paid the lowest rate, \$16.50 (£3 8s.). In the New England and North Atlantic States the average was \$33.19, with Massachusetts paying the highest, \$37.20. With board the average was \$21.60.—*Pacific Rural Press.*

Strength of Flour.

The term "strength" is used by the baker to express the combination of qualities which he associates with a flour of good baking quality; such as pile, texture, shape, volume, color, and weight of loaf. It is, in fact, another name for good baking quality. In order to place the problem on a satisfactory basis, the British Home-Grown Wheat Committee has arrived at the following definition of flour strength as "the capacity to make a big, well-piled loaf." Professor Wood further points out that this is a complex of at least two factors—size and shape of loaf. The definition thus stated appears to include all the qualities, the presence of which renders flour of good baking quality, and to provide a clear statement of the problem presented to us. What exactly determines this important quality is not accurately known, and the only reliable test of the strength of a flour is its actual behavior on baking. As this largely depends on the skill of the individual and the methods he adopts it cannot be considered an entirely satisfactory test, and many attempts have been made to determine the cause of strength and to devise some means by which we might be able to determine beforehand how a given flour will behave on baking. Several factors have been suggested as being responsible for strength of flour—such as the quantity of gluten, the

chemical nature of the gluten, amounts of sugar, of mineral constituents, &c., in the flour; but so far none of them have provided a satisfactory solution of the problem. The only test that has proved satisfactory in our experience is the power of the flour to absorb water—"its water-absorbing capacity," or the amount of water taken up by the flour to make a dough of the right consistency for baking. This test, though not one that can be carried out with extreme accuracy, has, with us at all events, always proved reliable, and the power of absorbing water has always been associated with good baking quality.—F. B. GUTHRIE, in a paper read before the Federal Convention of Master Bakers of Australia.

Trees and Climate.

The Chinese, by forest waste, have brought upon themselves two costly calamities—floods and water famine. The same will occur in Australia in time, if proper means of covering denuded hillsides with trees is not undertaken. In an open country of high winds nothing adds more to the comfort of existence than a protecting belt of trees about the home. Whether the wind be the hot one of summer or the cold blast of winter, its force is spent on the trees, and the house within is not swept by every passing gust. Orchards need break-winds to save them from injury in the gales that accompany summer storms, as well as to protect them from ordinary winds throughout the year. Gardens are more successful when surrounded by trees at a proper distance.—*Exchange.*

How Dairying Affects Fertility.

Where butter-making has been carried on in the United States for a number of years, the farms have steadily improved in production. Where cheese-making and milk-shipping has been the rule, farms have steadily declined in producing power. The reason is not far to seek. A ton of butter contains only about 50 cents' worth of fertility, and that only in what casein is left in the butter, whereas a ton of cheese contains about 30 dollars' worth of fertility. Consider what must be the final effect on the fertility of a farm where the milk is constantly sold off. If the owner of the farm realised what he was about, and purchased fertilisers to make up for this drain, the farm would not suffer. But not one farmer in a hundred will do this until it is too late. The milk of every cow that gives 4,000lbs. a year contains about 6 dollars' worth of fertility. If fed to calves and pigs after the butterfat is taken out, fully 80 per cent. of this fertility is saved to the farm. This would amount to 4·80 dollars (19s.) per cow. Suppose the milk-shipping

farmer has 30 cows. This would amount to 144 dollars (£25) a year. Now, will the milk-shipping or cheese-making farmer buy 144 dollars' worth of fertiliser a year to make up for the loss of this fertility? Not one in a thousand will do it; and yet he must do it or else the farm is being steadily drained of its fertility. Good dairy-farming consists, first of all, in so managing as to keep up the fertility of the land; next, in the production of the right kinds of crops and curing them in a way that will yield the largest amount of nutriment to the cows; lastly, in so managing to have the best cows possible to feed the crops to. Here are the three cardinal principles of dairy farming—good land, good crops, good cows; but at the bottom lies good land and a farmer wise enough to keep it good.—*Hoard's Dairyman*.

The Glasgow Grocers' Exhibition.

"The Grocers' Exhibition," writes the Trade Commissioner in London, "was opened in St. Andrew's Hall, Glasgow, by Sir George Reid (the High Commissioner for Australia) accompanied by the Agent-General, on March 29th, and remained open until Saturday, April 8th. The South Australian exhibits occupied the whole of the Kent Hall and Octagonal Hall—the former for general produce, the latter being used solely for wine, which included Keystone Burgundy, Emu Burgundy, and wine supplied by Messrs. Thomson and Co., agents in Great Britain for Penfold's vineyards. As I was able to obtain the whole of the Kent Hall for a comparatively low price, I introduced something new for trade exhibitions in the way of scenic effects, and I am pleased to say that the result exceeded my expectations. A perusal of the many newspaper cuttings which I forward will be sufficient evidence of the success of the venture, at any rate from an advertising standpoint. The *Scottish Trader* published a full descriptive account of the show, and also a *verbatim* report of the lecture I gave in connection with the exhibition. During the period the exhibition was open, well over 100,000 people passed through the turnstiles, including a large number of men actually engaged in the grocery and provision trade."

Imports and Exports of Fruits.

During the month of May 9,285 bush. of fresh fruits, 374 bags of onions, and 115 pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 424 bush. of bananas (chiefly overripe) were destroyed. At Serviceton 109 bush. of fresh fruits were also admitted. The exports to inter-State

markets examined and passed at Adelaide and Port Adelaide comprised 7,836bush. of fresh fruits, 3,432pkgs. of vegetables, and 81pkgs. of plants. In addition, 107bush. of fresh fruits were certified for export at Gawler, 1,560 bags of potatoes and 27bush. of fresh fruits at Coonawarra, and 164bush. of fresh fruits at Wirrabara. Under the Federal Commerce Act 7,521 cases of fresh fruit, 327pkgs. of dried fruits, 1pkg. of preserved fruit, 6pkgs. of honey, and 13pkgs. plants were exported to oversea markets during the same period. These were distributed as follows :—For London, 4,286 cases apples ; 22 cases pears, 265pkgs. dried fruits, 6pkgs. honey, 2pkgs. quinces, and 1pkg. jam ; for New Zealand, 1,214 cases citrus fruits, 375 cases grapes, 62pkgs. dried fruits ; for India and East, 1,494 cases apples, 103 cases citrus fruits, 20 cases grapes, 13pkgs. plants. Under the Federal Quarantine Act 1,439pkgs. plants, seeds, bulbs, &c., were admitted from oversea sources.

Broom Corn in South Australia.

Mr. A. Condell, of Clare, has been successful in growing a fine parcel of broom corn or broom millet (*Sorghum vulgare*, var. *technicum*) from seed supplied by Mr. A. W. Hendry, manager of the Royal Institution for the Blind, North Adelaide. It is believed that the plant can also be grown profitably on the irrigation areas of the River Murray, and it is noticeable that along the northern rivers of New South Wales the cultivation of broom millet has been found of late more remunerative than that of maize, and promises to become a large and profitable industry. In Victoria there are several hundred acres under crop. If the industry is to be successfully followed here, care will have to be taken in the growth and preparation of the fibre, as the broom manufacturers of Melbourne and New Zealand have recently been complaining of the excessive length of the stalks placed in the bales, and of "false packing" by growers in the eastern States, and have threatened to give preference to the American article, which can be delivered f.o.b. at £25 a ton, as against £23 for the Australian broom corn. The parcel delivered by Mr. Condell was so well grown and straight in fibre that Mr. Hendry paid for it at the rate of £26 a ton, or £3 a ton above the market rate for the imported broom corn. The "fibres," of which brooms are made, are simply the branches of the panicle or flower-cluster at the summit of the stalk after the seeds, leaves, and trash have been removed. A point of importance is that the fibres must grow straight, and to achieve this end the panicles are often bent downwards before they are ripe. The stalks are not allowed to exceed 6in. in length when cut, and the broom corn, after it has been thoroughly cured and dried, is baled for the market.

Preserving Wooden Posts.

A farmer, many years ago, discovered that wood can be made to last longer than iron in the ground. Time and weather seemed to have no effect on the timber. The posts can be prepared for less than 1d. each. This is the recipe :—Take boiled linseed oil and stir in pulverised coal till the mixture has the consistency of paint. Then apply.—*Scientific Australian*.

Dynamite in Agriculture.

Probably no stranger use for dynamite has ever been devised than its substitution in place of the plough for the tilling of clay land. It is being put to such a use on a considerable experimental scale in Kansas. The first experiment of Spartanburg consisted of the exploding of a stick of dynamite in each of a series of watermelon hills, and the resultant crop showed the benefit of the heroic treatment. The next experiment was the breaking-up of an acre field by dynamite. The cartridges were placed 3ft. apart in rows, and at a depth of 4ft. The holes were made by driving crowbars to the desired depth. The dynamite was exploded by a line of men provided with red-hot irons. The line went rapidly down the field, the explosions following the men in a steady roar that was deafening. The explosion threw clouds of soil 30ft. into the air, and covered the men from head to foot with dust and dirt. Clay land, when once disturbed to a depth of 4ft. to 5ft., is said never to revert to its former solid and impervious condition. One of the great troubles of the southern farmer of America has been to keep the clay from puddling and holding the water on the surface of the soil—a trouble thus removed.—*Pastoralists' Review*.

Digestibility of Meat.

The popular opinion that meat varies in digestibility—for instance, that pork is less digestible than beef or mutton—would appear to be incorrect, according to Farmers' Bulletin No. 391 of the United States Department of Agriculture, "Economical use of Meat in the Home." Experiments have shown that over 95 per cent. of the protein and fat of all kinds and cuts of meat is digested under normal conditions, and there are no marked differences in the thoroughness with which different sorts are digested. All meat is very digestible food. Utilising the cheaper cuts of meat in palatable dishes is, therefore, a sound practice, and the Bulletin gives a number of suggestions to overcome toughness and lack of flavor. Prolonged cooking at a low heat will make meat tender without hardening the fibres. Pounding meat before

cooking is liable to drive out the juices, and with them the flavor. A good way to escape this difficulty is to pound flour into the meat : this catches and retains the juices. In prolonged cooking, the flavor-giving extractives may be retained by first searing the exterior of the meat, and thus preventing the escape of the juices ; or by letting them escape and serving the gravy with the meat.

Australian Wheats in England.

An interesting paper on the behavior of some favorite Australian varieties of wheat when grown in Great Britain was read at the recent Sydney meeting of the Australasian Association for the Advancement of Science by Mr. A. E. Humphries, of Weybridge, England. The result was of a most dismal character, " for," says the author, " none of the wheats tried gave satisfactory results, and in nearly all cases they were absolute failures. Liability to rust under English climatic conditions was the principal cause of their failure. Wet and gloomy weather prevailed in June and July, and they were practically all destroyed by rust." The tests took place at Rothamsted in 1907 and 1908, on behalf of the Home Grown Wheat Committee of the National Association, with a large number of colonial and foreign wheats, to see whether any of them were suitable for distribution to British and Irish farmers, or for purposes of hybridisation and selection. The Australian varieties tried were Comeback, Federation, Gluyas, Marshall's No. 3, Nhill, Yandilla King, Jonathan, Florence, and Bobs, and some samples of Alpha and Huguenot from Western Australia. The result proves that we have evolved types of wheat excellent for Australia, but quite unsuited to the damp and cold climate of the British Isles.

Destructive Insects of Victoria.

We have received from the Department of Agriculture, Melbourne, Part V. of the Handbook of the Destructive Insects of Victoria, prepared by the veteran entomologist, Mr. Chas. French, F.E.S., F.L.S. This part is in keeping with previous parts in the matter of the high standard of work and the practical nature of the suggestions for dealing with the various insect pests. The book contains 170 pages of letterpress and 40 colored illustrations, 27 of which are of insects and 13 of insectivorous birds. Mr. French mentions that Part VI., which is now in course of preparation, will complete the series. Copies of Parts I. to V. may be obtained from the Secretary Department of Agriculture, Melbourne, on payment of 2s. 6d. per volume ; postage amounts to 1d. for each volume. A complete file of these handbooks should be in the possession of every orchardist.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

DRESSING FOR HORSES' HOOFES. *

"Novice," Hill River, asks how to mix tar for a hoof dressing.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"Use equal parts of soft soap and Stockholm tar."

POORLY OLD HORSES.

"Novice" asks what sort of powders should be given poorly old horses.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) recommends giving a wineglassful of raw linseed oil in the feed twice weekly."

SWELLING ON HORSE'S LEG.

"W. C. T." asks for treatment of mare, age about 10 years, which has a swelling on the near side front leg. The swelling is about the size of half-a-crown, and of a spongy nature. The animal goes slightly lame in the morning when cold.

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"From the description the swelling is evidently a strain of the flexor tendons. If of old standing it should be blistered with a mixed cantharides and biniodide of mercury blister (one to seven). After blistering, the animal should be turned out."

MORTALITY IN CATTLE FROM YACCA GUM.

"Selector" writes—"Can you inform me whether the eating of yacca-gum produces evil results to hoggets? From one or two experiences lately I have been inclined to think so."

The Government Veterinary Surgeon (Mr. J. F. McEachran, M.R.C.V.S.) replies—"In yacca country deaths amongst cattle and sheep have been put down to ingestion of this plant. The matter has never been fully investigated. The history, symptoms, and *post-mortem* appearances should be forwarded."

FREE v. YARDED POULTRY.

"Poultry-breeder" writes asking if poultry at liberty or in yards pay best.

The Poultry Expert (Mr. D. F. Laurie) replies—"If suitable yards and houses are provided and if proper food and methods of feeding are adopted it will pay to yard and house the poultry. Further particulars can be obtained on application."

DESTRUCTION OF TICK.

"Poultry Tick" writes—"My neighbor's premises are infested with poultry ticks, which come across into my yards and kill my fowls. Have I any remedy?"

Answer—Yes. Report the matter, giving full particulars, to the Poultry Expert, who will send an inspector. If ticks are present, instructions will be given to eradicate them at once.

TREATMENT OF MALLEE LAND.

"Scrub Farmer" asks—" (1) In mallee country, burnt 1908 and cropped in 1908-9-10 with wheat, consisting of sandy soil, from dark-red to white, which would probably give the better wheat return in 1912—to fallow in 1911, or to plant with oats and from 50lbs. to 80lbs. super. ? (2) On newly burnt mallee land (limy marl with reddish clay in places, average rainfall 18in.) what is the maximum amount of super. it would be advisable to use, and what would be the probable effect of 2cwts. of super per acre ?

The Director of Agriculture (Professor W. Lowrie, M.A., B.Sc.) replies as follows :—" (1) Fallow would give the better result. (2) On newly burned land, the effect of 2cwts. of super. per acre might be to force the wheat to too great a degree. There would be a risk that it would go down and be difficult to reap ; or if the season settled in dry and warm, after the wheat was in ear, the crop, too much forced, would probably be blighted a little in the tips of the ears, or the sample might be pinched. The after effect of 2cwts. of super. would be altogether good, as it would be one of the first means of increasing the value of the feed on the land. After the virgin fertility has been taken out there is no doubt that 2cwts. of super. might be used now and again with advantage, though, I think that dressing should be considered a limit for economic working on an 18in. average rainfall."

ROSEWORTHY AGRICULTURAL COLLEGE.

FOURTH REPORT ON THE PERMANENT EXPERIMENT FIELD:
SEASONS 1909-1910 AND 1910-1911.

By ARTHUR J. PERKINS (Principal Roseworthy Agricultural College) and
W. J. SPAFFORD (Assistant Experimentalist).

(Continued from page 967.)

CAN WHEAT UNDER LOCAL CONDITIONS OF CLIMATE BE MADE TO FOLLOW
ANOTHER CROP WITHOUT AN INTERVENING YEAR OF BARE FALLOW ?

It should be stated at the outset that even should we find ourselves compelled to answer this question in the negative, such an answer could not be taken to pronounce the doom of any form of rotation for the district and others similarly situated. The retention of bare fallow before wheat does not necessarily exclude rotation in other directions. It becomes, then, merely a question of finding other crops able to use land to advantage after wheat.

Any attempt to make wheat follow wheat as a matter of regular practice is, we think, apart from exceptional cases, doomed to more or less early failure. It is true that for more than 60 years Lawes and Gilbert showed at Rothamsted that it was possible to raise heavy crops of wheat year after year on the same plot of land. This, however, was no more than an effective academic demonstration of the fact that, given favorable conditions of climate and suitable manures, wheat crops do not necessarily injure the chances of similar crops following immediately in their wake. Not even Lawes and Gilbert ever thought of recommending, as a natural consequence of their experiments, the continuous growing of wheat in the country in which they were situated; indeed, the objections to the practice are too numerous and too self-evident to call for much comment. We possess certain results in this direction in some of the plots of the Permanent Experiment Field which we think may be quoted with advantage. When, in 1905, this field was first established seven of the plots were set aside with a view of ascertaining how long under local conditions wheat could be grown continuously with any degree of advantage. After three years' work these plots had to be abandoned. The chief, and in our view practically insurmountable, difficulty lay in the impossibility of coping with the weeds that went to seed before harvest time. The results of these experiments will be found summarised below in Table IV. They will, we think, prove instructive.

TABLE IV.—*Showing Average Returns from Seven Plots Continuously Under Wheat (1905-07) Comparatively with Averages of Plots Under Wheat after Bare Fallow.*

Year.	Rainfall. inches.	Total Produce per Acre			Grain per Acre.		Straw to 60lbs. of Gram. lbs.	Weight of Bushel. lbs.
		tons.	cwts.	lbs.	bush	lbs.		
1905	16.71	2	17	54	29	19	160	63
Bare fallow plots	—	2	11	68	28	30	146	63
1906	19.72	1	8	0	9	15	276	59½
Bare fallow plots	—	2	3	12	20	3	182	58½
1907	15.05	0	7	21	3	53	127	61½
Bare fallow plots ..	—	1	2	35	16	8	94	63½

We see here clearly demonstrated the futility of attempting to grow wheat continuously under local conditions. The grain crop fell from over 29bush. to the acre to a little over 9bush. in the second year, and to not quite 4bush. in the third year. In the second year the yield of the plots continuously under wheat was about 11bush. below the average of the plots that had been treated as bare fallow in the preceding season, and in the third year about 12bush. below. The hay yields were equally unsatisfactory, being in both the second and third season about 1 ton below the average of the plots treated as bare fallow in the preceding season. We shall not be blamed for having thrown up the experiment.

Whatever be the results of experimental research on the subject, general farming experience is there to prove that wheat cannot follow wheat to any advantage. There remains to be considered, therefore, the extent to which any other type of crop has a lowering tendency on the wheat yield relatively to a crop of wheat grown after a year's bare fallow. On this point we have exact experimental data extending over six seasons, some results of which we have summarised below in Table V.

TABLE V.—*Showing Returns from Wheat Grown in Rotation Comparatively with Wheat Grown after Bare Fallow.*

Plot.	Year.	Cropping.	Total Produce per Acre.			Grain per Acre.	Straw to 60lbs. of Gram. lbs.	Weight of Bushel. lbs.
			tons	cwts.	lbs.			
2	1904.....	Bare fallow	—	—	—	—	—	—
	1905.....	Pease	—	—	—	—	—	—
	1906.....	Barley	—	—	—	—	—	—
	1907.....	Pease	—	—	—	—	—	—
	1908.....	Wheat	2	14	8	27	28	63
	1909.....	Turnips	—	—	—	—	—	—
	1910.....	Barley	—	—	—	—	—	—

TABLE V.—*Showing Returns from Wheat Grown in Rotation, &c.*—continued.

Plot.	Year	Cropping.	Total Produce per Acre. tons cwt. lbs.			Grain per Acre. bush. lbs.		Straw to Weight 60lbs. of Grain. lbs.	of Bushel. lbs.
3	1904	Bare fallow	—	—	—	—	—	—	—
	1905	Barley	—	—	—	—	—	—	—
	1906	Pease	—	—	—	—	—	—	—
	1907	Wheat	1	6	7	18	40	96	62
	1908	Turnips	—	—	—	—	—	—	—
	1909	Barley	—	—	—	—	—	—	—
	1910	Pease	—	—	—	—	—	—	—
4	1904	Bare fallow	—	—	—	—	—	—	—
	1905	Pease	—	—	—	—	—	—	—
	1906	Wheat	2	8	58	19	27	219	—
	1907	Turnips	—	—	—	—	—	—	—
	1908	Barley	—	—	—	—	—	—	—
	1909	Pease	—	—	—	—	—	—	—
	1910	Wheat	2	9	38	23	22	176	62½
5	1904	Bare fallow	—	—	—	—	—	—	—
	1905	Wheat	1	19	70	22	23	137	63½
	1906	Turnips	—	—	—	—	—	—	—
	1907	Barley	—	—	—	—	—	—	—
	1908	Pease	—	—	—	—	—	—	—
	1909	Wheat	3	5	92	27	39	206	61½
	1910	Turnips	—	—	—	—	—	—	—
6	1904	Bare fallow	—	—	—	—	—	—	—
	1905	Pease	—	—	—	—	—	—	—
	1906	Oats	—	—	—	—	—	—	—
	1907	Beans	—	—	—	—	—	—	—
	1908	Wheat	2	12	75½	31	22	128	63½
	1909	Kale	—	—	—	—	—	—	—
	1910	Oats	—	—	—	—	—	—	—
7	1904	Bare fallow	—	—	—	—	—	—	—
	1905	Oats	—	—	—	—	—	—	—
	1906	Beans	—	—	—	—	—	—	—
	1907	Wheat	1	7	32	22	3	79	62½
	1908	Kale	—	—	—	—	—	—	—
	1909	Oats	—	—	—	—	—	—	—
	1910	Vetches	—	—	—	—	—	—	—
8	1904	Bare fallow	—	—	—	—	—	—	—
	1905	Pease	—	—	—	—	—	—	—
	1906	Wheat	2	2	53	18	16	200	56½
	1907	Mangolds	—	—	—	—	—	—	—
	1908	Oats	—	—	—	—	—	—	—
	1909	Vetches	—	—	—	—	—	—	—
	1910	Wheat	2	9	24	22	6	189	63½
9	1904	Bare fallow	—	—	—	—	—	—	—
	1905	Wheat	2	15	32	31	1	140	63
	1906	Mangolds	—	—	—	—	—	—	—
	1907	Oats	—	—	—	—	—	—	—
	1908	Vetches	—	—	—	—	—	—	—
	1909	Wheat	2	12	33	29	27	139	62
	1910	Kale	—	—	—	—	—	—	—

TABLE V.—*Showing Returns from Wheat Grown in Rotation, &c.*—continued.

Plot.	Year.	Cropping.	Total Produce per Acre tons cwt. lbs.		Grain per Acre bush. lbs.	Straw to Weight 60lbs. of Grain. lbs.	Weight of Bushel. lbs.
10	1905.....	Bare fallow	—	—	—	—	—
	1906.....	Wheat	2	8 100	23 43	171	58½
	1907.....	Bare fallow	—	—	—	—	—
	1908.....	Wheat	2	11 26	32 47	115	64½
	1909.....	Bare fallow	—	—	—	—	—
	1910.....	Wheat ..	2	5 98	19 49	199	64¼
11	1904.....	Bare fallow	—	—	—	—	—
	1905.....	Wheat	2	11 54	28 56	139	62½
	1906.....	Bare fallow	—	—	—	—	—
	1907.....	Wheat	1	8 92	20 31	97	62½
	1908.....	Bare fallow	—	—	—	—	—
	1909.....	Wheat	2	7 61	29 54	118	62½
	1910.....	Bare fallow	—	—	—	—	—

In the first portion of Table V. we see returns from wheat grown in two rotation groups based on the old Norfolk four-course rotation. Following on various more or less tentative trials in search of suitable subsidiary rotation crops these two rotation groups have now been definitely fixed as follows :—

Series A—

1. Turnips.
2. Barley.
3. Pease.
4. Wheat.

Series B—

1. Kale.
2. Oats.
3. Vetches.
4. Wheat.

It will be noted that in each group a root crop is made to open the rotation, whilst wheat immediately preceded by a leguminous crop comes in once in four years. Barley in one case and oats in another are respectively availed of as the second cereal of the rotation. As to what is likely to prove the local value of these various types of rotation and the returns from the subsidiary crops we shall say nothing at present. We wish here to concentrate our attention exclusively on the behavior of wheat in rotation comparatively with the returns of wheat grown after bare fallow and set out in detail in the second portion of the table. It should be noted in the first place that none of the rotation plots (Nos. 2 to 9 inclusive) have been treated as bare fallow since 1904, the year in which this type of experimental work was first put in hand; hence the 1909 and 1910 crops of plots 4, 5, 8, and 9 respectively represent wheat crops grown six and seven years after the last treatment of

these plots as bare fallow. If now we take the average of the grain returns of wheat in the two rotation groups, and compare these returns with wheat grown after bare fallow over the five seasons of which we have any record (we omit 1905, as in this year all wheat grown had been preceded by bare fallow), we shall find—

TABLE VI.—*Showing Average Grain Yields of Wheat in Rotations A and B Comparatively with Grain Yields of Wheat after Bare Fallow (1906-10).*

Year.	Wheat after Bare Fallow.		Average of Wheat in Rotations A and B.		Difference in favor of—Wheat after Bare Fallow.		Wheat in Rotation.	
	bush.	lbs.	bush.	lbs.	bush.	lbs.	bush.	lbs.
1906.....	23	43	18	42	4	51	—	—
1907.....	20	31	20	22	0	9	—	—
1908.....	32	47	29	25	3	22	—	—
1909.....	29	54	28	33	1	21	—	—
1910.....	19	49	22	44	—	—	2	55

Thus we see that in two years (1906 and 1908) the difference in grain yield was very much in favor of wheat after bare fallow—more than sufficient indeed at present rates to pay the rental cost of a year of idleness. Of these two years it has already been stated that 1906 was generally unfavorable to the growth of cereals, whilst 1908 proved to be an almost ideal season. In one year (1909), a very favorable year, the difference in favor of wheat after bare fallow, viz., about $1\frac{1}{2}$ bush., would not suffice to pay rental on land lying idle as bare fallow. In another year (1907), a very trying one except for favorable seeding conditions, there was practically no difference between wheat grown after bare fallow and wheat grown in rotation. Finally, in 1910 the difference was nearly 3 bush. in favor of wheat grown in rotation. This is all the more remarkable for the fact that the plots that carried wheat in rotation in 1910 had not been fallowed since 1904. Reference to Table III. will show that in this season (1910) the amount of rain falling on the fallows in the preceding season had been represented by the abnormal figure 17.79 in. ; that is, about $6\frac{1}{2}$ in. above the average of the previous 27 years. We see here a condition of affairs that might easily lead wheat after bare fallow to suffer. It is more than probable that the fallows were heavily leached by the abnormally heavy rains of January and March, which led to an all-round reduction in the yield of the district. This view would find confirmation in the yield of 25 bush. 48 lbs. from plot 30 of the Permanent Experiment Field, which, although sown after bare fallow, is always dressed with 1 cwt. of nitrate of soda.

Let us now proceed to examine the position from the point of view of the yield in hay of the plots.

TABLE VII.—*Showing Average Total Produce or Hay Yields of Wheat in Rotations A and B Comparatively with Wheat after Bare Fallow (1906-10).*

Year.	Wheat after Bare Fallow.			Average of Wheat in Rotations A and B.			Difference in Favor of—Wheat after Bare Fallow.			Wheat in Rotation.		
	tons	cwts.	lbs.	tons	cwts.	lbs.	tons	cwts.	lbs.	tons	cwts.	lbs.
1906	2	8	100	2	5	56	0	3	44	—		
1907	1	8	92	1	6	76	0	2	16	—		
1908	2	11	26	2	13	47	—			0	2	21
1909	2	7	61	2	19	7	—			0	12	58
1910	2	5	98	2	9	31	—			0	3	45

We see here that, with the exception of slight differences in 1906 and 1907, the hay yields show if anything heavier where wheat has been grown in rotation than where it comes after bare fallow. The difference of 12½cwts. in 1909 is worth noting, as the plots had not been fallowed since 1904.

Finally, if we take quality of grain to be represented by a heavy bushel weight we find the advantage to be slightly in favor of wheat after bare fallow, for which over the five seasons (1906-10) it was represented by an average of 62½lbs. against an average of 62lbs. for wheat in rotation.

Before stating our final conclusions we wish it to be clearly understood that between wheat after bare fallow and wheat in rotation there can exist no possible similarity in treatment, either as to tillage operations or manuring. We are not at the present moment endeavoring to ascertain which of the two practices is the more profitable under prevailing economic conditions, but merely whether locally it is possible to obtain from wheat in rotation returns at all approaching those from wheat after bare fallow dressed with 1cwt. of superphosphate. We have not, therefore, dealt with the relative expenditure involved, a subject which we propose examining under another heading.

In the meanwhile we feel justified in adopting the following conclusions: that in this district, and others similarly situated, under favor of such seasons as we have latterly experienced, two of which were more or less unfavorable to cereals, one year of bare fallow is by no means essential to the growing of good wheat crops, whether for grain or for hay.

WHEAT IN A TWO-COURSE ROTATION IN WHICH THE MAIN CROP IS IMMEDIATELY PRECEDED BY A SUMMER FALLOW CROP.

In the two typical rotation groups hitherto dealt with the wheat crop has always been immediately preceded by a winter sown leguminous crop, such as peas, beans, or vetches. Ultimately these crops have been treated as forage crops, and fed down by a flock of sheep. That the practice has, on the whole, proved successful we have clear evidence in the heavy wheat crops already recorded. There exists, however, another and simpler form of rotation which, in years gone by, had many local advocates; we refer to the

practice of sowing a summer crop, such as sorghum, millet, or maize, on early broken fallows. It is obvious that in this case the subsidiary crop of the rotation is dependent for success on abnormal summer conditions, at all events so far as this district is concerned. With rains above the normal means in December and January good sorghum crops may be depended upon—crops that are of considerable value to a dairy herd. In such circumstances the usual practice appears to consist in turning the herd into the sorghum field so soon as sufficient grain shall have formed to obviate any possible danger from prussic acid poisoning. It should be stated that a more satisfactory, although perhaps more costly, method of handling the crop would consist in cutting and chaffing the sorghum and, according to circumstances, either feeding it green or ensiling it. In the absence of a dairy herd the intrinsic value of a sorghum crop may be questioned on an ordinary farm, although, no doubt, sheep may at times be made to turn it to some advantage. The objection to it from the latter point of view, however, is that in years in which a summer fallow crop is successful there is always available elsewhere an abundant supply of natural sheep feed, whereas in cases of failure it involves the farmer in altogether unnecessary expense and unavoidably dirty fallows.

Side by side with the rotations already referred to we have endeavored in the Permanent Experiment Field to test this form of two-course rotation, and for the purpose we have adopted amber cane throughout as the type of summer crop preceding the wheat crop. The results recorded from 1906 to 1910 are summarised below in Table VIII.

TABLE VIII.—*Showing Returns of Wheat after Sorghum Comparatively with those of Wheat after Bare Fallow (1906-10).*

Year.	Total Produce per Acre						Grain per Acre			
	after Sorghum.			after Bare Fallow.			after Sorghum.		after Bare Fallow.	
	tons	cwts.	lbs.	tons	cwts.	lbs.	bush.	lbs.	bush.	lbs.
1906	2	0	39	2	8	100	18	3	23	43
1907	0	17	22	1	8	92	13	7	20	31
1908	2	9	96	2	11	26	28	17	32	47
1909	2	1	49	2	7	61	20	44	29	54
1910	2	0	44	2	5	98	18	25	19	49
Means.....	1	17	95	2	4	53	19	43	25	21

Table VIII. shows very clearly that in no single season has wheat after sorghum at all approached the returns of wheat after bare fallow, either in the matter of grain or of that of hay. It will be noticed that in some seasons the differences have been very considerable, particularly where grain yields are concerned. This was the case in 1907—an unfavorable cereal year—with a difference of close on 7½ bush., and in 1909—a very favorable season—with a difference of over 9 bush. In the end, over the five seasons concerned,

the mean advantage of wheat after bare fallow was represented by no less than $5\frac{1}{2}$ bush. to the acre ; this, in our view, is a difference above the average net value of a sorghum crop. These differences, however, are less pronounced if we take into consideration merely the hay value of the crop. It should be noted in this connection that in 1907 the difference in favor of wheat after bare fallow exceeded 11 cwts. to the acre. As might have been anticipated in this direction the differences are most pronounced in those seasons in which spring and early summer rains were relatively low. The mean difference for the five years was represented by 6 cwts. 70 lbs. in favor of wheat after bare fallow. The mean bushel weight of grain was also in favor of wheat after bare fallow, being represented by $62\frac{1}{2}$ lbs. against $61\frac{1}{2}$ lbs.

Further, wheat after a summer crop such as sorghum compares unfavorably with wheat after a winter crop such as peas, vetches, or beans. For the five years concerned the difference in favor of the latter was represented by a mean of nearly 9 cwts. of hay and 4 bush. 14 lbs. of grain, whilst the mean bushel weight of wheat after a leguminous crop was represented by 62 lbs. against $61\frac{1}{2}$ lbs.

We believe that these differences in favor of both wheat after bare fallow and wheat after a winter crop are attributable mainly to the fact that a summer crop tends to a greater degree to exhaust the soil of available moisture and does not permit of thorough tillage operations, so essential to the success of good wheat crops. On present results, therefore, we are inclined to the opinion that in our district and others similarly situated a sorghum crop is not to be recommended before wheat, except possibly on farms on which dairying is made to occupy a preponderating position. Nor is this likely to be of frequent occurrence in the district in which we are placed.

(To be continued.)



OUR FEATHERED FRIENDS.

PROTECTED NATIVE BIRDS.

(Continued from page 939.)

SPOTTED BOWER BIRD.

SCIENTIFIC NAME: *Chlamydodera maculata*.—*Chlamys* (Greek): "a mantle," *dere*, "neck," alluding to the rose-pink band that crosses the back of the neck; *maculata* (Latin): spotted.

SIZE.—In size the bower bird is a little smaller than a pigeon, but larger than a dove. A full-grown bird is between 10in. and 12in. long.

BILL.—Dark brown or black, with a pink shade in the skin at the corners of the mouth.

FEET AND LEGS.—Dark brown to black.

PLUMAGE.—Mottled brown, relieved by a rose-pink to lilac colored band across the back of the neck. The top, back, and sides of the head are rich brown, each feather being margined with a still darker shade. The back and wings are dark brown, but each feather is marked at the tip with a light spot, which produces a mottled effect. The throat, breast, and underneath tail feathers, which are tipped with buff, are mottled with dark brown. Crossing the back of the neck is a bar of rose-pink to lilac colored feathers, which readily distinguishes it from other birds.

HABITAT.—Scrubby and well-timbered dry localities inland. The spotted bower bird has been recorded from the Murray.

FOOD.—Chiefly seeds and berries of native plants.

THE BOWER.—The pair of bower birds build a bower or avenue of sticks and grass. This bower is not the nest, but the playground of the birds. They collect pieces of bleached bone, pieces of bright stone, and bits of pearly shell, which they scatter immediately about the entrance of their bower.

NEST.—Saucer shaped, loosely built of twigs and lined with grass. It is usually placed in a thick pine or melaleuca. Nesting operations extend over the months of October, November, and December.

EGGS.—The usual number in a clutch is two. It is, however, not uncommon to find three in a nest. The eggs vary very much in shape and size, but average measurements are about $1\frac{1}{2}$ in. x 1in. The eggs are light yellowish green, beautifully marbled with reddish brown and dark umber. Bluish grey blotches appear below the surface. The markings often resemble zig-zag brush marks.



THE GREAT LARVA

THE GREAT LARVA

THE GREAT LARVA

THE GREAT LARVA

BROWN TREE CREEPER.

SCIENTIFIC NAME: *Climacteris scandens*.—*Klimakter* (Greek) : rung of a ladder ; *scandens* (Latin) : climbing, both in allusion to the climbing habits of the bird.

SIZE.—In size this little bird resembles the starling.

PLUMAGE.—Decidedly brown. The top and back of the head are dark brown in color, the side of the head is a russet brown, which gradually merges into the dark spotted fawn color of the throat. The back and tail feathers are russet or rusty colored, the latter being crossed with a dark brown bar. The wings, which are dark brown, are crossed with a bar of lighter shade. The breast is light brown and striped from the front backward with dull white markings running down the centre of each feather.

HABITAT.—Open wooded country, where it may be seen ranging the trunks of trees. It climbs forward or backward, ever taking a spiral course about the tree trunk.

FOOD.—Its food consists chiefly of bark life—insects that live under the loose, dry, clinging bark.

NEST.—The nest is constructed of fine fibrous bark, and lined with some soft material, such as hair from animals. The position usually selected is a hollow in a branch.

EGGS.—The eggs, which number two, measure about $\frac{1}{2}$ in. x $\frac{3}{8}$ in., and are of a reddish color, spotted with brown, and bluish-grey markings, the latter appearing below the surface.

WOOD SWALLOW.

SCIENTIFIC NAME: *Artamus sordidus*.—*Artamos* (Greek): butcher, from its dexterity in hunting insects; *sordidus* (Latin): dirty, smoke-colored.

SIZE.—The wood swallow is about 7in. long, measured from the tip of the beak to the tip of the tail.

BILL.—The beak is bluish but tipped with black.

FEET AND LEGS.—These are of a leaden-grey color.

PLUMAGE.—The head, with the exception of a dark brown spot between the beak and eye, is of a smoky brownish grey color, so also are the neck and body. The wings, which are dark slate in color, are margined upon the outer edge with white. The tail feathers are dark slate in color, and tipped with white, with the exception of the two central ones.

HABITAT.—They are particularly fond of open timbered country, and live together in great numbers, sometimes crowding together upon a bare limb in such numbers as to resemble a giant swarm of bees.

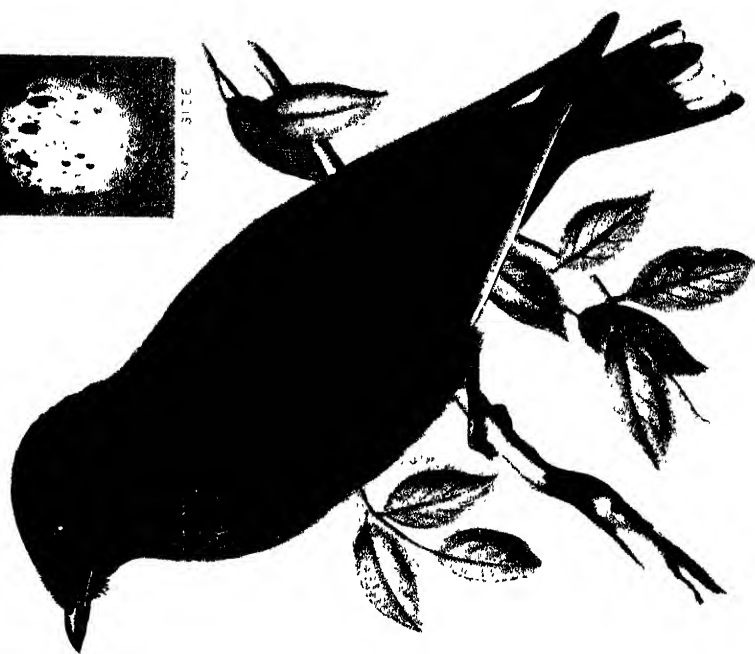
FOOD.—The wood swallow is insectivorous, and one of the most useful of birds to the gardener.

NEST.—The cup-shaped nest is built of fibrous bark and grass, and usually placed in a crevice on the spout of a dead limb. The wood swallow nests during the months of September, October, November, and December.

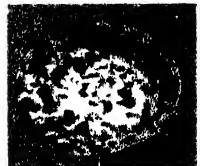
EGGS.—The number in a clutch is generally four. In color the eggs vary, but are mostly dull white, speckled with very dark brown. The eggs measure about $\frac{1}{2}$ in. x $\frac{8}{12}$ in.



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W. L. G. 1850
No. 1
No. 2
No. 3



GROUND LARK, OR PIPIT.

SCIENTIFIC NAME : *Anthus australis*.—*Anthos* (Greek) . probably a yellow wagtail ; *australis* (Latin) : southern.

SIZE.—The pipit is slightly plumper and longer than a sparrow.

PLUMAGE.—The general appearance is light mottled brown. The head, back, and wings are light brown flecked with darker markings, running from the head backwards. The striped effect is caused by a dark-brown central line running the length of each feather. The two outer tail feathers are partly dull white. The throat is dull white, the breast and under tail feathers being light brown to buff.

HABITAT.—Grass land, fields, and open country.

CHARACTERISTIC MOVEMENTS.—The pipit is a fast runner, and flies with a rather heavy undulating movement.

FOOD.—This harmless little bird feeds chiefly upon seeds and insects.

NEST.—The nest, which usually occupies a small depression in the ground, such as a hoof print, is composed of dry grass.

EGGS.—A clutch usually consists of three greyish-white eggs flecked with grey and brown. The pipit rears as many as three broods in a season. They may be found nesting from September until January.

WHITE-FRONTED CHAT.

SCIENTIFIC NAME: *Ephthianura albifrons*.—*Ephthimai*, to dwindle, and *oura* (Greek), a tail, in allusion to the short tail; *albifrons* (Latin), white-fronted.

SIZE.—From beak to tail this pretty little bird is about 4½ in. in length.

BILL.—The beak is black.

FEET AND LEGS.—Dull black.

PLUMAGE.—The face, forehead, throat, and under surface of the male bird are white. A black band crosses the chest, and, running up each side of the neck, expands to form a black patch on the crown of the head. The back is dark grey, slightly tinged with brown. The wings and tail feathers on the upper surface are very dark brown to nearly black, and tipped with white. The female is more soberly colored, the face, head, and back being greyish brown. The throat, chest, and abdomen are dull white, and a black crescent crosses the lower chest.

MOVEMENTS.—When disturbed the chat cries “Tang,” and moves away by a series of short, low flights and rapid runs, its tail bobbing as it goes.

HABITAT.—This little bird likes open grass land, where it feeds.

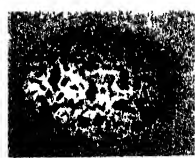
FOOD.—Chiefly insects and other minute animals.

NEST.—It makes its nest close to the ground, and for preference in a bunch of rushes on the edge of a watercourse. The nest is open, and cup-shaped. It is made of grass and lined with wool or feathers.

EGGS.—The eggs, which number three or four, are of a flesh-pink color, speckled at the broad end with brown spots, which form a zone.



THE WHITE GULL
 FROM THE STORM
 L. J. M. 1891



THE WHITE GULL
 FROM THE STORM
 L. J. M. 1891

CHall

AGRICULTURE IN OTHER LANDS.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College.

SOUTHERN FRANCE.

(Continued from page 861.)

BORDEAUX AND ITS ENVIRONS.

I left Montpellier on October 4th, and gradually worked my way towards Bordeaux by Cette, Carcassonne and Toulouse. I lingered a day at Carcassonne, a city of considerable interest to the student of the middle ages, for the old "Cité" is even to this day completely begirt by that double line of fortifications and towers against which in the thirteenth century the Black Prince threw himself in vain. As one proceeds in a north-westerly direction towards Bordeaux, the agricultural aspect of the country changes completely; the "Midi" is gradually left behind, and with it to a large extent the never-ending vineyard areas. At this time of the year it is ripening fields of maize that begin to take their place, or else temporarily vacant areas that are being prepared in anticipation of approaching cereal seeding operations. I noticed that well-groomed bullocks leisurely drawing single-furrow ploughs altogether outnumbered the visible draught horses of the districts through which we were passing. The erect, sentinel-like poplar, too, appears to have completely replaced the spreading plane tree of the Midi.

I reached Bordeaux in the evening of the 5th. This is an important town of close on 300,000 inhabitants, and the third seaport of France. It gathers added importance from the fact that it is the official centre of the celebrated French claret districts; indeed, wine exports form one of its chief sources of revenue. In another direction I understand that the inhabitants of Bordeaux enjoy the reputation of gastronomic enthusiasts. From personal experience I can say that rarely have I met individuals who appeared to attach greater importance to the rites of the table; more perhaps than any other community may they be said to live to eat.

Through the kindness of Mr. McDonald (the British Consul) I was introduced to Mr. Barton, of Messrs. Barton & Guestier, one of the principal wine firms of the town. I was very kindly shown over their town cellars, which consist for the most part of a veritable labyrinth of winding drives, running under buildings and neighboring streets. Here I saw stacked away

over 2,000,000 bottles of the choicest clarets and countless rows of casks. In accordance with local usage, which would prove fatal if adopted in Australia, these casks were lying with bunghole on one side, and left on ullage for six months at a time. Bottling operations were in full swing at the time of my visit, and I had occasion to notice how little mechanical devices so common elsewhere had found favor in this ultra-conservative district. Apparently bottling or capsuling machines were things not to be thought of; they might have the effect of reducing the quality of the wine, which from time immemorial has been successfully bottled without them.

On the following day Mr. Barton was good enough to motor us over country districts adjacent to the town. I was thus able to see Chateau Margaux, Chateau Lafitte, and Chateau Barton-Léoville. I was highly amused at the somewhat hostile reception accorded to us at Chateau Margaux. In my 12 months' wandering over different parts of the world it is the only instance of the kind that I met with. Indeed, hitherto my experiences in this direction had been monotonously tame. It appeared to me that all those whom it had been my good fortune to meet felt that they could not do enough for a somewhat inquisitive stranger. Chateau Margaux, however, supplied the excitement of a novel experience. Its management is in the hands of a callow youth, so primed up with occult knowledge of his craft that he appeared to think that a mere glimpse of his speaking features might betray some of the secrets he so jealously guarded from the eyes of discerning visitors. A party of foreigners to look over Chateau Margaux! The invisible potentate sent out one of his understrappers to take charge of us, with instructions apparently to pilot us dexterously away from whatever might prove of interest. I expressed a natural desire to look over the wine cellars. Our unfortunate guide, who was politeness personified, and appeared loath to disappoint us, seemed for the time being to have forgotten the exact spot where the cellars happened to be. Twenty to thirty minutes were thus wasted in fruitless search, when, to our inexpressible joy, the irate magnate appeared on the scene. He immediately proceeded to explain to Mr. Barton in most voluble French—which language, unbeknown to him, I happened to understand—what he thought of Englishmen, Australians, and Americans, who flocked down from all the corners of the earth with the sole object apparently of picking his brains. Mr. Barton, with the tact of a diplomatist, proceeded to stroke his ruffled feathers, and explained that not only did I not own a single vine, let alone a wine cellar, but that I was merely attracted here by idle curiosity, backed up by admiration for the magnificent wines made under his immediate supervision. Eventually diplomacy carried the day, and we were finally allowed to look into the cellars, where preparations were being made for the vintage. In the circumstances, I felt compelled to sink my identity and confine my admiration to the immaculate cleanliness of the premises.

The Chateau Margaux vineyard is 200 acres in area, and kept in perfect order; not a weed to be seen, not a shoot out of place. Here, in accordance with the usual practice of the district, the vineyard is ploughed up four times in the course of a year.

Mr. Barton informed me that all the Chateau Margaux wine had been sold in advance for a period of five years at the rate of £16 the Bordeaux hogshead (about 50galls.)—that is to say at the rate of 6s. 3d. a gallon. This apparently is by no means an exceptional price for the wine of these cellars, as much as £40 a hogshead, or about 16s. a gallon, having at times been paid for it.

At Chateau Lafitte, which is owned by the Paris Rothschilds, our reception was very different. The manager showed us very courteously over the cellars, and willingly supplied all information in his power. Vintage operations had not yet been put in hand. I was shown the large, shallow cement tanks in which, in accordance with local usage, the fruit is still trod out under foot, and from which husks and juice are transferred to large, open wood fermenting vats, of a capacity between 6,000galls. and 7,000galls. General fermentation very rarely outlasts a week, and the new wine is rapidly transferred to new hogsheads of the best Austrian oak. The area of the Chateau Lafitte vineyard is the same as that of Chateau Margaux, viz., 200 acres.

Later on we visited Chateau Barton-Léoville, the patrimony of our host. Here we were shown the ancient fiddle, to the melodious strains of which, in accordance with time-honored custom, the harvested fruit is rhythmically trod under foot. The buildings are spacious and well kept, as indeed appears to be the case throughout the district. I had occasion to regret that my visit should have fallen upon a more or less idle day. Vintage was only just about to begin. We were introduced to the vast kitchen, in which was in course of preparation the evening meal of the working staff. Although hoary with age, this room was spotlessly clean, a shining example of what can be done when a proper pride is taken in the daily task. We wandered over the grounds and vineyards; the latter beautifully kept, but showing, unfortunately, little more than what we should call a good second crop. The whole district appeared enveloped in gloom, for the vintage appeared likely to prove a more or less complete failure. Mr. Barton did not think that more than a fifth of a normal crop would be harvested for the whole district. Apparently, in this neighborhood, the caterpillar of a moth known to the French as *cochylis* is quite as much to blame as the abnormal prevalence and virulence of cryptogamic diseases, the natural consequence of a very wet season. This caterpillar—a close relative of our old friend the codlin moth—attacks the vine flowers in the early spring, just as they are about to open; and later on in summer there appears a second brood, which lores its way into the berries, enveloping them the while in a light, silken web. The damage done this year by the *cochylis* has been very considerable. Let us avoid importing this undesirable emigrant.

As one traverses the Bordeaux vineyards one cannot help being struck with the curious results of the extreme parcelling of property in France. Here and there, wedged in amidst the vines of larger owners, without fence or division of any kind, one comes across a dozen rows or so of vines, said to be the property of some small peasant owner. An ancient custom has decreed that whilst wine made from the larger areas may be worth £16 a hogshead, the wine from these few intruding rows can never rise above ordinary Médoc. Careful manipulation has doubtless much to do with the ultimate quality of any wine; it must be admitted, however, that imagination has its full share in the commercial classification of Bordeaux wines, established hundreds of years ago, when it may have had its *raison d'être*, but maintained to-day I believe very largely in the vested interests of the most conservative of trades.

From time to time one hears it stated that the Bordelais vinegrowers had manfully stood out against the introduction of American vines, and set themselves to master the phylloxera by other means. I can readily understand the heartiness of their initial opposition to any practice unknown to their grandfathers, for they are too painfully aware that let them vary but a hair's breadth from general ancestral practice, and forthwith, in sympathy, down come the market quotations of their wines. The phylloxera, however, an American intruder without time-honored pedigree, was not to be denied. Ancestral cult and ancestral scruples were soon swallowed up in black ruin, and the conservative Bordelais found themselves compelled to borrow the methods of their more enlightened neighbors; and to-day, I was credibly informed, the great bulk of Bordeaux vines are grafted on resistant American stock. Nor does one hear much talk of any depreciation in quality of the new wines, as who should, before the logic of accomplished facts?

The district through which we were driven had all the appearance of poor country from the general agricultural point of view; the soil is light in character, and more or less stony on the surface. It is certainly fortunate that soil of little value for other purposes should be able to yield wine the general quality of which has never been approached anywhere else in the world. Here and there one even runs into the sandy wastes of the Landes, once a standing menace to neighboring towns and villages, but now more or less completely reclaimed and fixed by vast plantations of pines (*Pinus maritima*), which are periodically tapped for their resin.

THE LANDES AND THE PYRENEES.

On October 9th I set out for Bayonne, in the direction of the Spanish frontier: I thus had the opportunity to traverse the Landes, that flat, dreary waste of country so largely planted over with Maritime pines during the course of the last century. I have collected some interesting figures which

will serve to illustrate the progress of afforestation in this district within recent times. The total area of the Department of the Landes is represented by 2,330,325 acres. Of this area there were in 1842, under forest trees, 583,110 acres, *i.e.*, over 25 per cent. of the total area, in 1860 the area under forest trees had risen to 959,900 acres, *i.e.*, over 41 per cent. of the total area; and in 1882 to 1,299,380 acres, *i.e.*, close on 56 per cent. of the total area. I have not had occasion to see more recent statistics; but I have no reason to believe that the afforested area has undergone any reduction since 1882. The bulk of the forest lands, as is indeed the case throughout France, are State owned; portion of them, however, are the property of local *communes*; and portion again that of private individuals. Although the great bulk of these forests consist of Maritime pines, exploited both for their timber and their resin, there are also to be found in the Landes forests various types of oaks, poplars, chestnut trees, robinias, &c. The value of these forest lands is said to have varied in recent times within the following limits:—

	£	s.	d.	£	s.	d.
In 1852—From	9	2	9	to	14	10
“ 1862 “	6	4	6	“	40	18
“ 1882 “	6	10	7	“	33	15

In this connection, I take it that, from our point of view, the principal interest attaches to the reclamation and afforestation of the sandy wastes and dunes bordering the Atlantic Ocean, which, for centuries hampered settlement on the south-west coast of France. These moving dunes are said to have choked up watercourses and engulfed forests, and even towns and villages. These waste lands which adjoin, and indeed form part of the Landes, are said to cover an area exceeding 220,000 acres. Their reclamation and afforestation was first taken in hand in 1781 by the engineer Brémontier. The work has been continued and completed during the course of the last century on the lines originally laid down by him. To-day, reclamation and afforestation have, more or less, completely shorn these moving sands of their power for evil; nevertheless, they continue to call for constant watchfulness, lest the toil of a long century should, after all, go for nothing; and the cost of the upkeep of the reclamation works is said to exceed £12,000 a year.

With our present superabundance of territory we do not always realise how dangerous, in time to come, may prove these sandhills which we ruthlessly strip of their covering of native shrubs and trees, that our flocks and herds may the more readily graze thereon. But, even within our days, the late Albert Molineux never wearied of pointing to the damage that was already being done by the moving dunes of the Coorong, and from time to time we hear of the spasmodic efforts of private individuals to stem the advancing sand. But not until the whole power of the State is brought to bear on the

matter, and a scheme of protection be worked out on rational lines, as was the case in France some hundred years ago, will anything like success be obtained ; and the longer the time we take to realise that such must be the case the costlier and more difficult is the task likely to prove.

As one approaches Bayonne and the Pyrenees the general character of the country changes for the better. One gets glimpses of opulent pasture lands confined by luxuriantly overgrown hedges, curiously suggestive of Ireland.

I spent five days in the neighborhood of Bayonne and Biarritz, but find that the only note of general interest made thereon has reference to the sumptuous trappings of the bullocks hauling the local carts. The pride of each driver appears to have become concentrated upon his yoke, which is not only useful, but ornamental into the bargain ; it is generally bedecked with the whitest of sheepskins.

One day we spent in motoring into the Pyrenees and over the Spanish frontier ; from sea-level we gradually rose to 3,500ft. at Roncevaux. The scenery was fine and the mountains well wooded ; but, unfortunately, more or less continuous rain took some of the gilt off the outing. We passed through Saint-Jean-Pied-du-Port, now a picturesque village, once the capital city of Basse-Navarre. We crossed the Bidassoa and stood on the bridge separating France from Spain, and finally ascended to Roncevaux, where, according to legend, Charlemagne and his Paladins were defeated by the Saracens. In appearance, at all events, there is little to choose between the Basque of the French slopes of the Pyrenees and his cousin of the Spanish slopes. He is clean-shaven, wears a "bérét"—a sort of Tam o'Shanter cap—and on festive or ceremonious occasions is addicted to sombre garments, knee-breeches, and flat-brimmed hats. I was not much impressed with the cows occasionally to be met with grazing on the hill slopes ; they have coarse, stag-like heads, and very defective milk vessels. Oxen, mules, and asses appear to be the usual beasts of burden ; horses are but rarely met with. Fine old oak trees are sorely maltreated in the district ; they appear to be systematically pollarded to a height of 9ft. to 10ft., and their gnarled stems stand crowned with a wild, weak growth ; and beneath them are stacked up the lopped branches, apparently the customary firewood of the country. At the time, here and there, farmyard manure was being distributed over the fields in small and distant heaps, which argued of scarcity, for the average dressing did not appear to me to exceed 3 tons to 4 tons to the acre. I noticed a few, more or less, ill-grown maize crops ; and, on the whole, apart from their glorious woods, and from the agricultural point of view, these mountainous regions have very far from a prosperous appearance.

I now found myself beset with difficulties. The next stage in my wanderings should have taken me from Bayonne to Spain. At the time, however, Portugal was in the throes of political revolution ; and the daily press never wearied of impressing on the public that it would be Spain's turn next and

that right speedily. On the other hand, the great French general railway strike was threatening country towns such as Bayonne with isolation, and acts of "sabotage" were of daily occurrence. Had I been alone there was nothing very alarming in this state of affairs; I had, however, to think of others in my charge. Finally, I decided that it was, on the whole, preferable to risk the chances of a Spanish revolution rather than remain cooped up indefinitely in Bayonne; hence, on the 14th of October, we were fortunate enough to secure seats in a special train making for the Spanish frontier. The regular train between Paris and Irun had been delayed by the strike, and, fortunately, as yet, the Bayonne railway men were only considering the desirability of joining in the fray. By way of precaution, however, the railway line was guarded throughout its length by an extended line of armed patrols.

SPAIN.

On the frontier the attentions of Customs officers were unremitting. Contrary to usual custom, they overhauled and minutely examined every article in our possession. It was "bombs" and other anarchist gear that they were after, apparently. We were incurring the penalty of travelling in troublous times, and possibly in bad company. Another surprise awaited us on the threshold of Spain. I had taken the precaution to take out beforehand "combined circular railway tickets," covering a specified itinerary over the Spanish railways. As we proceeded to board the Spanish train we were very politely informed that it was a special train, and that if we wished to travel by it we must take out a special supplementary ticket. There was no time to argue the question, and with all the good grace that I could summon I submitted to what I was inclined to look upon as an act of extortion. Later on, however, it was brought home to me that in Spain all trains are special trains, with the exception of a few, which in equipment and pace are little better than ordinary goods trains. The distance between Madrid and Seville, for instance, is 355 miles by rail; this distance is covered by the ordinary train in $24\frac{1}{2}$ hours, that is to say, at the rate of a little over 14 miles an hour. In the circumstances one cheerfully pays the supplement and travels by the special. One should beware of imagining, however, that railway expenditure ends with the purchase of circular tickets. There is this much to say in favor of slow railway travelling: I never once found Spanish trains to be behind scheduled time; indeed, they frequently anticipated it. In Italy, on the other hand, there appears to be no connection whatsoever between scheduled time and the time actually observed by the railways.

Our destination was now Madrid, by rail 392 miles from the frontier, a distance covered by the special in 15 hours and by the ordinary in 26 hours. At first the railway line winds in and out of most picturesque mountain scenery. I noticed on favorable slopes frequent maize fields, much greener

and less forward than those of south-western France. Evidently here the altitude is sufficiently great to neutralise the usual influence of latitude. Here and there a well-tilled field of sugar-beet or mangolds lends variety to the landscape. Robinias appear to have been planted very freely along the railway line and in its immediate neighborhood. South of Alsasua, however, erect poplars tend to supersede them. We were now traversing a rather flat, uninteresting tract of country of no very promising agricultural appearance. I noticed, occasionally, flocks of gaunt, hungry-looking sheep—not Merinos—flat-ribbed, long-legged, and wholly unprepossessing. From Santa Olalla, southwards, autumn ploughing appeared to be in full swing—the plough, the old Roman wooden plough; the team, a pair of patient oxen; and the furrow, a mere scratch on the face of mother earth. They were



Andalusian Mules Carting "Ockey Chaff."

breaking up last year's stubbles, with the intention, no doubt, of sowing them again to cereals on the first appearance of rain. These stubbles, as far as I was able to see, were very far from the remains of heavy, well-grown crops. Occasionally small heaps of farmyard manure were to be seen scattered over the fields, but in even smaller quantities than those I had already noted in the Basque country. As we approached Burgos the character, both of the soil and general agricultural operations, appeared to improve. Thereafter falling darkness gradually screened from our view what of interest might attach to the country-side; and eventually we steamed into Madrid at 11:30 p.m.

I made Madrid my headquarters until the evening of the 18th. The town is without any particular *cachet* of its own; it is no more than the replica of many a town of its size scattered over southern Europe. The

Prado Museum is justly celebrated for its unique collection of the works of Velasquez the great, and of Murillo the entranced; to my taste, however, it is somewhat overburdened with fleshy, Dutch paintings.

I took advantage of our stay in Madrid to visit El Escorial, the vast monastery and mausoleum, erected by Philip II., in fulfilment, it is said, of a vow made in time of battle, and ever since the burial place of Spanish monarchs and their consorts. Externally, these massive granite buildings, that appear to spring out from granite flanks of the Guadarramas, have a forbidding, prison-like appearance; internally, their general sombreness is sometimes relieved by over-ornamentation. Of the various portions of this stupendous edifice, the Pantheon—ever since the time of Philip II. the last resting place of Spanish monarchs—must, in its simplicity of conception and design, always leave the most abiding impression on the mind of the interested visitor.

El Escorial is 31 miles by rail from Madrid. This, therefore, was my first acquaintance with the country in the immediate neighborhood of the capital. I had often heard of the bleak, inhospitable character of this central plateau of Spain. At this time of the year one realises that it has not been maligned; and yet there appears to be no lack of depth in its yellowish grey soil, which may be possessed of latent fertility, capable of telling quite another tale at a more favorable time of the year. The most striking feature of the landscape is the total absence of trees in any shape or form. It has been stated—with what amount of truth I do not know—that thousands of peasants of Castile and Leon live and die without ever having set eye on a single tree. Complete extirpation of all trees appears to have been the inhabitants' drastic remedy against grain-eating birds. One is tempted to the conclusion that the remedy has out-Heroded Herod. For what would not wisely distributed shelter-belts do towards tempering the climate of this bleak plateau, some 2,500ft. above sea-level? This dreary waste of country accompanies one from Madrid to the slopes of the Guadarrama, and then gives way only to a veritable wilderness of huge, weather-worn granite boulders.

ANDALUSIA AND GRANADA.

On the evening of the 18th of October we left Madrid for Southern Spain, where lie the fairest and in many ways the most interesting provinces of the Peninsula. For it is here that the Moors lingered longest before their final expulsion in 1609, and it is here that are to be found in greatest profusion the architectural relics of their domination and those progressive agricultural methods imposed by them on a semi-barbarous people. For was it not the Moors who taught the Spaniards that wherever running water is available the desert may be made to blossom like the rose? And the five centuries that now separate us from the period of their ignominious expulsion, and all the terrors of the holy inquisition have not sufficed to efface the imprint of their footsteps. My earlier days had made me tolerably familiar with the

Moors and Arabs of Northern Africa, some of whom, indeed, were the direct descendants of these unfortunate Andalusian Moors. For to this day is to be found in the Moorish quarter of Tunis a street known as the "Street of the Andalusians." It was here that, centuries ago, these flying Andalusians found a haven of refuge amidst their kindred, carrying with them the keys of their abandoned Spanish dwellings, keys which to this day their descendants cherish as sacred heirlooms in the vain hope that the day may yet dawn when they will serve to drive back the time-rusted bolts. And now, at Seville, had I not known that the Moors had held sway here centuries ago, the very circumstances that surrounded me would have revealed it. The Christian Andalusians of the present day, their general appearance, their habits of life, their street cries, even to their personal idiosyncrasies, were all strangely familiar to me, and strongly reminiscent of the impressions and sensations of other days. The Arab's idea of music is certainly not our own, and although from the minaret top he will demonstrate freely enough that he has some notions of voice production, he does not deem it art to avail himself of it in the droning of his melancholy chants. The Arab in singing barely opens his mouth, and hums out in a minor key his nasal melodies from perfectly expressionless features. This is his special idiosyncrasy, peculiar to him, I take it, in all the world. And yet here in Seville was the same trick of execution, the same melodies, and, for all I know, the same words. The spirit of the vanished Moor still broods over the land.

BULLFIGHTS AND LOAFERS.

Whilst I was in Andalusia I was informed that bull-fighting was very largely responsible in Southern Spain for the existence of a vast number of hopelessly incorrigible loafers, who were fast becoming a menace to the community. From their earliest days country youths aspire after the honors and emoluments of the successful bullfighter. In their eyes he is the national hero, *par excellence*, to be admired and applauded in the present and, if possible, to be succeeded in a rosy future. To this day children may be seen playing at bullfights, quite as much as in the days of Velazquez, of which he has left us on canvas a realistic record; hence, on the approach of manhood, there are hundreds who endeavor to give effect to the dreams of their childhood, and the threshold of the arena is thronged with would-be *espadas*. Unfortunately there are but a select few who have all the requisite natural aptitude for the perilous game. The unsuccessful are slow to recognise their hopeless unfitness, and the time comes when they find that whilst they have failed in one vocation they have also lost aptitude and desire to earn their living in any other calling. And in this manner the ranks of the dangerous and unemployable are constantly being recruited. This, I was informed, was one of the social sores of every Andalusian town of any importance.

THE ANDALUSIAN OLIVE GROVES.

What the vine is to Southern France the olive tree is to Southern Spain. One traverses here mile upon mile of almost continuous olive groves, and from the railway carriage at times nothing beyond their grey-green livery comes within the range of the traveller's vision. From the outset there arose a point in connection with these Andalusian olive groves which puzzled me much, and it was only after patient cross-examination of many a grower that I succeeded in solving the riddle. Every now and again one meets in these groves what appears to be a young tree protected all round by a conical mound of earth about 5ft. to 6ft. in height. I could not understand



One-Year-Old Olive Tree Mounded up and Grafted

why growers should go to the trouble and expense of shovelling up so great a quantity of earth for no particular purpose. City folk appeared to be under the impression that it was a precaution adopted to secure the union of the graft. Such an explanation appeared to me ridiculous on the face of it, as there exist hundreds of cheaper and simpler methods for securing the same result. When I started interviewing growers I was further puzzled by an almost unanimous opinion that olive trees yielded payable crops between their third and fifth year; here, then, was evidence that in Spain at least olive trees are not planted out by the benevolently inclined for the special benefit of future generations. Ultimately it was by piecing together these two puzzles that I was able to get at the wherefore of this strange practice.

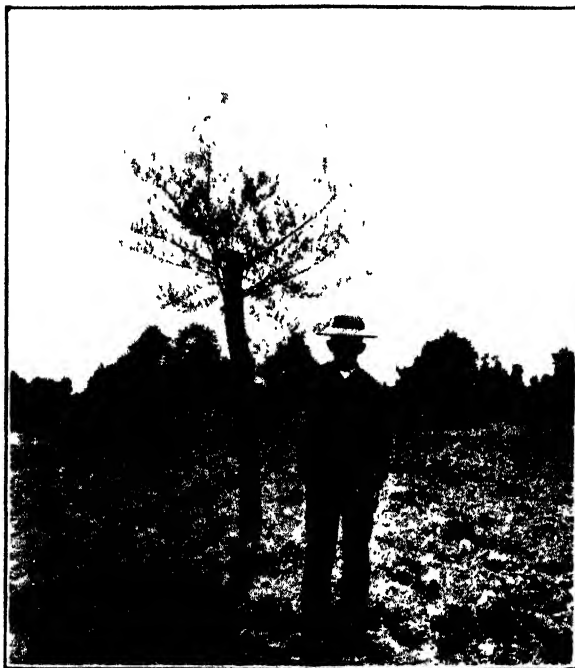
This apparently is what takes place. A new olive tree is always started from the shoot, or truncheon, of a wild olive tree, of which apparently many natural groves exist. The term "truncheon," however, is not used here in the sense that we usually attach to it, viz., a shoot 12in. to 18in. long and about 1in. to 1½in. in diameter. The Spanish truncheon would be more correctly described as a strong limb or branch of a tree. It is 9ft. to 10ft. long, and the thicker the better. I was told by a very intelligent old olive-grower that the diameter of the truncheon should not be less than 4in. to 5in. at the small end. This huge truncheon, or limb, is placed erect in a hole 3ft. deep dug for the purpose; hence, whilst 3ft. of the limb are below ground, 5ft. to 6ft. are above it in the shape of a stem for the future tree. One can realise readily enough that a young tree of this kind, set up at so much expense, would stand in need of special protection. Its leverage above ground is very considerable, and if in the early stages it be jarred or moved in any way, whilst the young roots are in process of formation, there will be a tendency to tear the latter away from the stock and otherwise hinder their normal development. The huge mound of earth which is now heaped up against the stem will serve to protect the tree against accidents of this kind. This, however, is very far from being the main object of the mound. This long, denuded stem, 5ft. to 6ft. in height, offers an enormous evaporating surface in the summer months; hence the mound of earth fills a double purpose—it affords support to the young tree, enabling it to make suitable root growth at its ease on the one hand, and on the other it protects the plant from the desiccating influence of the sun's rays and of bleak winds. During the summer months these young olive trees are sometimes watered by the simple but somewhat primitive device of boring oblique holes in the mounds of earth and pouring water into them.

Planting and mounding up of the young trees takes place in the early winter months. No shoots are allowed to grow from the plant except a few from the summit, which are grafted in the summer. With the return of winter weather the mounds are taken down, and the stem of the young tree, which by this time will have been firmly rooted, is exposed to the air.

On the whole this is certainly a very costly system of planting. What, then, are its special advantages, if any? They appear to me, if I was correctly informed, to lie in the fact that a mounded-up young tree will yield payable crops of fruit from five to six years sooner than is the case under the usual methods of treatment. This fact alone amply justifies, in my opinion, the heavy initial outlay, provided always that it is not accompanied by other objections that did not come under my notice. It appears to me possible that trees raised in this fashion may prove shorter lived than is usually the case. In any case I propose testing this method of olive-planting at Roseworthy in the coming season. Even were the complete success of the system definitely proved in South Australia, we should always find ourselves faced

with the difficulty of securing limbs of the requisite dimensions. I should add here, too, that all growers appeared very emphatic as to the absolute necessity of making use of wild olive branches only. It is possible, however, that this view may have originated in a natural reluctance to lop off large branches from grafted and fruit-bearing trees.

In Granada, the planting practice in vogue appeared to me essentially different. In this province one meets frequently with what appear to be trees with four main branches, of approximately similar dimensions, starting immediately from the soil, like the trunks of four separate trees. And,



Two-Year-Old Olive Tree.

effectively, this is what they are. Instead of establishing from the outset a single tree, in this district they appear to plant out four stout truncheons, about 2in. to 2½in. in diameter, on the angles of a square, with a side of about 20in. to 24in. All four truncheons are allowed to strike root and form, eventually, four separate trees, starting approximately from the same spot.

It would appear that in Spain, as I already noted to be the case in Greece, olive trees are always grafted at a considerable distance above ground, frequently 5ft. to 6ft. The graft is protected by a coat of moist clay, maintained in position by a strip of white calico.

According to the somewhat conflicting statements of growers I had occasion to interview, the distances apart at which trees are planted vary from 8 paces to 14 paces, which I take to be 24ft. to 42ft. This represents from 25 to 76 trees to the acre. It appears to be the general practice to adopt rather close planting on the richer types of soil. On the whole, the Spanish olive trees did not impress me much with their size. It appears to be a very common practice to grow cereal crops between the rows of olive trees; barley generally being preferred for the purpose. The latter is sown in autumn at the rate of 55lbs. to the acre, and they generally count on a yield of about 15 to 20 times the amount of seed sown, that is to say, about 16bush. to 22bush. to



Autumn Work in Andalusian Olive Grove.

the acre. Normally, olive groves not under cereals are supposed to be ploughed three times in the course of a year, namely, in January, in March, and in May. In this connection it may be stated that whilst I certainly saw in Andalusia some very well-tilled olive groves, examples were not wanting of almost complete neglect and abandonment. It should be added that the 1910 crop was an almost complete failure, which may in some measure account for the apathy of some of the growers.

Pruning practice I found to vary much on the same lines as is the case in the olive-growing districts of the south of France. All growers I questioned were absolutely unanimous on the absolute necessity of pruning the trees, if one wished to secure good crops. Some, however, preferred pruning the trees rather heavily in alternate years, whilst others were in favor of regular yearly pruning. As far as I was able to see, growers, in their pruning operations, appeared to aim at maintaining the trees well within control; nowhere did I see very large overgrown trees.

The pickling olives—invariably of the Queen olive variety—are always individually hand-picked; whilst olives to be used in the manufacture of olive oil are beaten off the trees with light wands and received on a sheet stretched out below.

In this district I was informed that 10cwts. of olives to the acre would be looked upon as a good crop. How this yield compares with statistical data for the whole country is shown below. It is true that I was cautioned against attaching too much importance to Spanish official statistics. In my experience, however, complaints of this sort are common to all countries. If statistics do not confirm our own preconceived ideas, they are forthwith condemned as faulty and bad; if the reverse is the case, they are proportionately extolled. I submit, therefore, the data below, subject to the caution I received, which may or may not be well founded.

The total area under olive trees in Spain was given as 3,383,000 acres in 1907, and 3,469,300 acres in 1908. It would appear, however, that the difference of 86,300 acres between the two totals does not so much indicate an actual increase in area under olive trees, as a more accurate determination of areas in 1908, than was the case in 1907.

The total Spanish olive crop is said to have been represented in 1907 by 1,579,641 tons. This works out at an average yield per acre of $9\frac{1}{2}$ cwts. of olives, that is to say, not far from my informant's estimate as to what constituted a good crop in Andalusia. It follows, therefore, that 1907 must have been a good olive year in Spain. Of the total 1907 crop, 1,507,059 tons were employed in the manufacture of oil; whilst the balance, 72,582 tons, were presumably used for pickling purposes. Olives used in the manufacture of oil returned a total of 73,762,259galls. of oil, that is to say, an average return of 2.14galls. of oil for every hundredweight of olives.

Olive returns were by no means as satisfactory in 1908. The total crop is said to have attained to 812,936 tons of olives, or slightly over $1\frac{1}{2}$ cwts. to the acre. Of this total, 796,207 tons were absorbed in oil manufacture, and the balance, 16,729 tons, presumably in the pickling business. The total amount of oil produced reached 36,337,893galls., i.e., an average return of 2.28galls. of oil for every hundredweight of olives.

These figures serve to show how great a factor in the national wealth of Spain is the olive oil industry. From inquiries I made on the subject it would appear that within recent times the value of a gallon of oil on the Spanish markets has varied between 3s. 3d. and 4s. 7d. If we adopt 4s. a gallon as a fair average figure, the total olive oil crop would have been worth to the nation, in 1907, about £14,752,452, and in 1908 about £7,267,579.

I have already stated that I was informed that 10cwts. of olives to the acre would be looked upon as a good crop in Andalusia. This would represent about 24galls. of oil to the acre, or a gross return to the grower of about £4 16s. an acre, which, in a country in which living is relatively cheap, would, I presume, be looked upon as a very fair return.

The great bulk of the oil produced appears to find a local outlet. Indeed, Spaniards may be said to live upon it. I notice that in 1908 the exports of olive oil are officially valued at £776,742 and in 1909 at £970,705; whilst pickled olives were responsible for £225,704 in 1908 and for £274,259 in 1909.

Thus, in 1909, out of total exports to the value of £34,299,185, the olive industry of Spain was responsible for £1,244,964.

Wages in this district appear to be very low. An ordinary agricultural laborer receives two pesetas a day (about 1s. 6d.); and, in addition, a few of the necessities of life, represented by oil, vinegar, salt, pepper, garlic, and tomatoes. Olive-pickers, on the other hand, receive only from 5d. to 7½d. a day, together with a little firewood to remind them that they are alive.

SEVILLE AND ITS ORANGES.

We tarried at Seville from the 19th to the 23rd of October. Had I the leisure, there were much to be written, and to good purpose, of this semi-Moorish city, resting on the banks of the broad Guadalquivir. Here we may see the Alcazar, that ancient palace of the Moorish kings, and its beautiful gardens; the wonderful cathedral, awe-inspiring in its size, and enriched by many an art treasure; the Museo Provincial, with its priceless collection of Murillos; the House of Pilate; the beautiful palm-sheltered squares; the quaint Moorish houses, &c. All matters, however, having not the remotest connection with things agricultural. I turn aside from them, therefore, with regret.

The British Consul (Mr. A. L. Keyser), who received me very courteously, supplied me with an introduction to a Scotch resident of Seville, Mr. McDougall by name, who was good enough to give me some information on agricultural matters. The staple produce of the countryside appears to be represented by oil, wine, and oranges. According to Mr. McDougall, in the neighborhood of Seville, bitter oranges are grown almost to the exclusion of any other varieties. For the last 10 or 12 years, however, these trees have been in a very parlous condition. Indeed, what little I saw of them did not serve to impress me much with their healthiness. It would appear that the leaves, and even the fruit, are regularly attacked by some form of rust, which causes them to wither away and fall to the ground, much to the detriment of the tree. Apparently no remedy for the disease has yet been discovered.

It would appear that Spanish orange-growers generally are beginning to feel the stress of foreign competition in the markets of the world. At their special request the Government has started on an inquiry into the actual position of affairs. It seems that within recent years the Spanish orange output has outrun what the markets of the world are prepared to take at remunerative prices from the Spanish grower's point of view. The following figures will serve to show to what extent, within recent years, exports have risen and average prices fallen.

Exports of Spanish Oranges.

Year.	Total Oranges Exported.	Total Value.	Value per Ton.		
	Tons.	£	£	s.	d.
1896	215,303	1,514,815	7	0	9
1900	260,226	1,444,414	5	11	0
1905	409,631	1,740,740	4	5	0
1907	469,297	2,607,107	5	11	0

Great Britain absorbs a good bit over half the oranges and lemons exported from Spain. Recent figures concerning these two lines are shown below.

Imports into Great Britain of Spanish Oranges and Lemons.

	Tons.
1906	235,320
1907	270,097
1908	256,689

It would appear that the total area under oranges and other citrus fruits in Spain is in excess of 100,000 acres.

VINEGROWING IN SPAIN.

In Mr. McDougall's opinion vinegrowing in Spain is a very poor business with the phylloxera to reckon with. He estimates the cost of establishing a new vineyard on American stock at £16 an acre; and with the low prices at present obtaining in Spain he is inclined to look upon this initial outlay as prohibitive. I was informed that the average price of common wine varied between 3½d. and 7d. a gallon. Table grapes are sold at the rate of 7d. to 9d. the arroba (about 25lbs.), which works out at £2 10s. to £3 3s. 3d. a ton.

It would appear that throughout Spain the vinegrowing industry has fallen upon critical times, and the representative bodies of both growers and wine merchants are petitioning Government to take steps towards helping the industry out of its difficulties. The following recent statistical data will serve to show the national importance of vinegrowing.

Year.	Acres under Vines.	Total Grapes Harvested.	Tons per Acre.	Grapes for Winemaking.	Wine Made.	Wine to One Ton of Grapes.
	Acres.	Tons.	Tons.	Tons.	Gallons.	Gallons.
1905	3,653,260	3,074,340	0.84	2,748,850	389,483,116	142
1906	3,496,925	2,436,817	0.70	2,158,410	298,644,190	138
1907	3,418,638	3,114,931	0.91	2,846,468	404,455,414	142
1908	3,275,778	3,146,058	0.96	2,889,654	408,247,774	141

In conjunction with the above figures it should be noted that in 1908 Spain made 3,528,150galls. of brandies of various types and 8,827,260galls. of strong spirit from wines. The above figures will serve to show how important are the interests involved in the crisis through which the industry is said to be passing. It will be noted how low are the yields per acre; in no single year was a yield of a ton of grapes to the acre attained.

On the whole it is easy enough to account for the present crisis. It is the old story of over-production under the temporary stimulus of abnormal prices, with corresponding depression on the gradual disappearance of previously available markets. When in the early eighties the old French vineyards were practically swept away by the phylloxera, the wine-drinking French population had to look elsewhere for wine that was almost as essential to them as bread. In this direction their immediate neighbors, the Italians and Spaniards, benefited temporarily by contributing to the pressing necessities of the French. This abnormal state of affairs led to extensive vine-planting in Spain, in the same way as I have shown elsewhere in this report it led to extensive currant-planting in Greece, and for a few years big business was done by Spain in this line. Indeed, Spanish wines were particularly sought after by French winebuyers, mainly, it is said, because their high alcoholic strength, their great body and color, readily allowed of their being increased in volume, once over the border, by the process that the French sometimes irreverently term "baptising." In the course of time, however, the French vineyards slowly rose again from their ashes, and French growers naturally resented this somewhat unfair competition of the strong, full-bodied Spanish wines which had found so much favor in the eyes of the merchants; hence a comprehensible French viticultural crisis, followed by new Customs arrangements, which had the effect of practically shutting the door to the common Spanish wines; and the Spanish vine-growing industry which went up like a rocket came down like a stick. There are a variety of remedies that are being advocated to enable growers to get out of the difficult situation in which they find themselves. Amongst these may be instanced the free distillation of wines, the enforcing of the law which prohibits the fortifying of wines with any other spirit than wine spirit, rigid enforcement of the law against adulteration, the opening up of new markets (particularly in Spanish America and Cuba), and, finally, approaching Great Britain with a view to persuading us to forbid the sale of wine made in England from raisins as Spanish wines. The latter proposal emanates from the Reus syndicate of wine exporters, who aver in all seriousness that artificial wines are "manufactured on a gigantic scale in the Argentine Republic, in the north of Germany, *but above all in England!*" Great Britain is at the present time Spain's best customer; Spain, on the other hand, does not import from Great Britain more than 18 per cent. of her total imports. If we are to offer a refuge to Spanish wines, it would seem reasonable to ask her to lower her somewhat prohibitive tariff in other directions.

According to the President of the British Chamber of Commerce of Barcelona, Great Britain imported in 1909 3,248,000galls. of Spanish wines as against 2,970,000galls. of French wines.

If the falling off of exports alone give any clue to the magnitude of the crisis, there appears to be good reason for the outcry of Spanish vinegrowers. Thus in a short period of 10 years—1897 to 1907—the total exports of wine fell from 117,816,206galls. to 34,947,830galls. This represents a fall in exports of over 70 per cent., quite sufficient in itself to jeopardise the position of the most firmly-seated of industries. The vinegrowing industry continues, nevertheless, to constitute an important source of national wealth, as the following figures clearly prove :—

Value of Spanish Exports connected with Vinegrowing Industry.

	1908.	1909.
	£	£
Common red wines	748,300	888,448
Sweet Malaga wines	812,334	600,892
Sherry and other dessert wines .	257,512	452,778
Common white wines	251,926	235,593
Raisins	844,704	764,260
Fresh grapes	493,000	414,040
Crude tartar	208,926	195,408
Total vine exports	£3,616,702	£3,551,419

There is little doubt but that we are likely to be affected indirectly by this Spanish crisis, for in general character their wines more closely approach South Australian wines than those of any other country that I know of. The competition of Spanish wines on the London market are therefore more to be feared by us than that of the lighter French wines; and although the British Government is not likely to grant to Spain special concessions in this direction, it behoves us, nevertheless, to watch whatever action in this direction the Spanish Government may be driven to by the importunity of the vinegrowers.

(To be continued.)

AGRICULTURAL BUREAU CONFERENCE.

SOUTH-EASTERN BRANCHES.

(Continued from page 953.)

EXPERIMENTAL WORK AT KYBYBOLITE STATE FARM.

Mr. W. J. Colebatch gave a valuable and instructive address on "The 1910-11 Harvest at Kybybolite Experimental Farm." He said the farm was fairly representative of some of the newly acquired land in the South-East, and since he had had control of it he had been confronted with great difficulties in that he was unable to see how the farmers, under existing conditions, were going to make a do of it. He had asked himself would he be prepared to put money into the land as things were, and he had been compelled to confess that he would not. He might be wrong, and hoped that time would show that he was wrong; but the results during the past 12 months—and after all, the rainfall, 28.36in., had not been much above the average for the last five years, 27.5in., although, certainly, it was badly distributed—had been anything but encouraging. That was a dismal note, but it was the only one he could conscientiously sound. The whole settlement had not averaged 6bush. of wheat to the acre; and, personally, he had not got back more than 75 per cent. of the seed sown. An attempt had been made to grow some mixed hay crops (different rates of seeding), including Wilkinson's Prolific and Cape oats, Wilkinson's Prolific and Algerian oats, Baroota Wonder and Algerian oats, Majestic and Dun oats, King's Early and Dun oats, and rye and Algerian oats. The average, however, had worked out at only 1 ton, notwithstanding that the rye and Algerian oats went 2½ tons to the acre. If the results indicated anything it was that on the average the greatest returns were to be secured by sowing a mixture of between 1½bush. and 2bush. of seed to the acre. When he said that he had said all there was to be stated regarding the lessons learned.

MUST DRAIN.

While he remained at Kybybolite the one thing above all others which he would advocate was drainage. He fully recognised that it would be of little use going in for permanent experimental work until the farm was properly drained. Further, he would have to reduce the size of the various paddocks, because that cementy-ironstone-rubbly land would not allow the water to sink through, and drains must be made around each block. The farm was

fortunate in that it possessed a runaway hole, into which the water from two-thirds of the property could be drained. If it could be demonstrated at Kybybolite in three or four years, as a result of efficient drainage, that, instead of only 21cwt. of hay to the acre, they could get 35cwt. or 40cwt. as a general average, there would be some inducement for the Government to take in hand the laying of the principal drains and main feeders. With the carrying out of the work indicated he believed it would eventually be one of the finest estates in South Australia. He could assure them that if he did not consider Kybybolite was going to be a success he would not continue to be associated with it. They had already proved that with dry seasons they could grow excellent crops; and he felt confident that by means of boundary and under drains they could drain the property at a cost which would not make farming on that land a difficult financial problem. Passing to the wheat crop, 70 acres were sown with different varieties of seed under good conditions; but practically the whole of the paddock was ruined through the excessive moisture. The same difficulty was experienced with French spring wheats as with some of the special varieties on the farm when he took it over, and even Dart's Imperial had failed utterly. The previous year, in the same paddock, Professor Angus had a like experience. Experiments with Algerian, Dun, Cape, and New Zealand Dun oats, sown at the rate of 1½ bush. to the acre, had not given even payable returns. An idea of the tremendous quantity of moisture in the ground cultivated might be gathered from the fact that the head drain ran a banker during the wet months. Altogether, last year, they dug 170 chains of drains. Summed up, the average returns from the cereal crops were—Oats, 13 bush.; barley, 3½ bush.; and wheat, 5 bush. 20 lbs. In years to come he hoped to bring the present results forward and compare them with figures which he was certain would give much greater encouragement.

SUMMER CROPS.

Relative to summer crops the smile was undoubtedly on his side, at any rate to a considerable extent. Farmers in the neighborhood who had inspected the crops had said, "Yes; but just remember the seasons; rain every fortnight!" The season admittedly had been favorable. Nevertheless he did not consider the crops had anything like the chance they should have had had he managed things better. Some of the crops were not put in until much too late, but this year he hoped to get them in toward the latter end of September. By drilling—not broadcasting—the seed in he was confident they could grow sufficient summer fodder to fill a big silo and maintain a good-sized dairy herd; that, too, without irrigation. Indeed, he believed he could grow lucerne without irrigation. Among other things he tried all the varieties of maize he could obtain, and sowed the seed with 1 cwt. of bonedust to the acre, in a paddock having drains along two sides. Victorian Flat Red gave a

return of 3 tons 11cwt. to the acre, which would pay well. If that had been sown early and cut early, a certain amount of second growth would have been secured. Yellow Moruya, which yielded 2 tons 7cwt. 3qrs., he liked even better than the Victorian. Early Red Hogan returned 2 tons 3cwt. 1qr., Hickory King 1 ton 18cwt. 2qrs., Sibley 1 ton 14cwt. 1qr., and Eclipse 1 ton 11cwt. 2qrs. The only millet worthy of special mention was Japanese, which gave 1 ton 2cwt. 2qrs. to the acre, and was now showing a nice second growth. Of the sorghums, drilled in 1cwt. of bonedust, Imphee (popularly known as Planter's Friend) went 3 tons to the acre, and promised to furnish an exceedingly good second crop. The Broom corn did not appear to him to be so good as some of the more fleshy sorts. Jerusalem corn yielded at the rate of 2 tons 3cwt. 1qr., and Ambergane 1 ton 6cwt. 3qrs. per acre. The average returns of the three fodders were—maize, 1 ton 12cwt. 2qrs.; sorghum, 1 ton 12cwt. 2qrs.; and millet, 8cwt. 2qrs.

TUBERS AND ROOTS.

The potato experiments, he believed, would prove fairly satisfactory. He obtained good seed from Mount Gambier, and put in half of the supply with 4cwt. of superphosphate, and the other half with 8 tons of farmyard manure. Digging operations had not been completed yet, but there seemed every reason to expect an average of 3 tons. Although two blocks of rape and several varieties of swedes had been sown, he was not in a position to give any information relative to the results. A few weeks ago the plants were demolished right down to the stock by aphid. The kail, on the other hand, was only now showing signs of the aphid. As an indication of the feeding value of this product during the last month 125 sheep had been kept on a 10-acre block, and they were only just beginning to leave their marks behind them. Personally he thought they could put in three times the quantity of kail on the farm each year, and find it of the greatest advantage. From seed sown with 1cwt. of bonedust he had cut as much as 4 tons 12cwt. 3qrs. per acre. In connection with the turnip experiments seed was drilled in at the rate of 8, 10, 12, 14, 16, and 32 ozs. to the acre, but he was not prepared to announce the results, as here again the growth had been affected by the aphid, and to a certain extent by want of cultivation between the rows at the time when really required. He considered that if by using the new improved drills they could adopt the New Zealand practice of sowing the seed at such rates that the turnips would not need to be thinned, they could go a long way toward carrying their sheep through the time of scarcity, about July. In conclusion, Mr. Colebatch said he was a little more optimistic than he would appear to have been, judged by his opening remarks, for he felt that the time was coming when they were going to successfully drain that portion of the South-East. They would have to work, however, in conjunction with the Victorian

(Government, and go back nearly as far as Horsham. In answer to questions, Mr. Colebatch stated that the kail seed was sown at the rate of 1½ lbs. to the acre.

Mr. Sassanowski warmly congratulated Mr. Colebatch upon having brought the summer fodders to the state indicated. If he could demonstrate that, assisted by proper drainage, he could produce equally satisfactory results with cereals the settlers on Kybybolite and Binnun would have every reason to be well pleased with their investments.

EFFECT OF FERTILISERS ON THE GERMINATION OF SMALL SEEDS.

Mr. W. R. Birks, B.Sc. (foreman at the Kybybolite State Farm) presented an admirable paper on "The Effects of Fertilisers on the Germination of Rape and other Small Seeds." Having indicated that it was only with the germination of the seed that he proposed to deal, and not with the growth of the plant, he remarked—"While at Roseworthy College last year I was able to devote a good deal of time to this subject, both in the laboratory and the field. I am greatly indebted to Professor Perkins for his assistance, particularly for direction and guidance in planning the experiment. The work occupied several months altogether. The subject was brought under my notice originally by complaints of poor germination of rape seed, which reached the department from farmers in different parts of the State. The difficulty did not seem to be merely one of inferiority of the seed. For instance, Mr. Pengelly, of Aldinga, I am given to understand, had the following experience. Rape drilled with superphosphate during the morning of a certain day came away well, while seed sown similarly, but during the afternoon of the same day, almost entirely failed to germinate. As it was the same sample of seed used in both instances the fault obviously lay elsewhere. Farmers who suffered in this way had in almost all cases adopted the general practice of mixing the seed with fertiliser and sowing through the manure box. And it has become customary to blame superphosphate for poor germination which has been experienced. When more inert substances are used in the same way, for instance bonedust, a satisfactory strike is generally obtained. In fact, I believe that it is the usual practice in this district at least, to sow with bonedust and to avoid, as far as possible, bringing rape seed into contact with super. Superphosphate, however, is commonly accepted as the standard fertiliser for almost all soils and crops in South Australia, and it was the object of my experiment to determine whether a set of conditions could not be found under which it would be safe to sow rape and other small seeds in admixture with superphosphate. The subject is thus chiefly of interest to farmers actually engaged in the cultivation of rape, and especially to those who do not feel justified in purchasing a special drill for the seeding of this crop. With such drills, of course, there is no difficulty in sowing these small seeds direct from the seed box. There are a number of

them on the market, and a very efficient example is at present in use on the farm at Kybybolite. However, as I indicated above, this work was undertaken for the benefit of those who are accustomed to use the ordinary wheat drill for seeding rape.

EXHAUSTIVE TESTS.

"Tests were arranged in a number of series. The first part of the experiment was devoted to the determination of the effect of planting seed in soil under varying conditions of moisture content. The soil used in the majority of the tests was a sample of good average loam from one of the College wheat fields. In the first place a portion of this soil was sifted and air dried. That is to say it was reduced to the condition in which it would be found in the field in dry weather. A number of ordinary saucers were half filled with this soil and 100 rape seeds scattered on each, together with a quantity of superphosphate, which, in comparison to the size of the saucer, would correspond to a dressing of a little over 1cwt. per acre. Ten of these saucers were set in this way. The seed from one was removed and germination tested after one day; and from another after two days; another after three days, and so on up to 10 days. The method of testing was as follows: The seeds after being sifted from the soil, were placed on moist blotting in saucer, which was placed in a germinating chamber. The latter was kept warm by means of a lamp. The seed was thus given every chance of germinating, and as each developed a healthy young plant it was recorded and removed. In this way any injurious effect of the superphosphate lying in contact with the seed in dry soil would have been rendered evident by a diminished germinating power of the treated seed compared with untreated seed. No such difference, however, occurred. In each about 80 per cent. of the seed germinated. This corresponded with the normal germination of untreated seed. That is to say, from this test it would appear that so long as the seed lay with super. in *dry soil* no damage to the former results. A similar test was then conducted, using a sample of the same soil to which however 10 per cent. of moisture had been added. This brought the soil to a state in which the moisture was just perceptible to the touch, though still insufficient to promote rapid germination of the seed. This is precisely the condition of the soil which is in practice considered dangerous, and under these conditions each lot of seed suffered in germinating capacity. There was no marked difference in the loss experienced in the case of seed lying with the superphosphate in the soil for one day and those so treated for the longer periods. The average reduction in germination was 17 per cent., representing a loss of about one quarter of the seed which would have germinated normally. The same soil was tested with gradually increasing quantities of water. The loss gradually diminished with increasing degrees of moisture until, in soil containing 15 per cent. of moisture or more, seeds germinated to the normal extent. In these

cases it was necessary to remove them from the soil to test their vitality. They sprouted in the ordinary way in the presence of the super. Soils in which this occurred were quite moist to the touch, and in a condition which the farmer would consider fit for the reception of seed. These tests may therefore be summarised as follows: Where seed was set with superphosphate in soil which was either thoroughly moist or air dry, no damage to the germinating power of the seed resulted. When, however, the soil was in an intermediate 'dangerous' condition, loss occurred to the maximum extent of about 25 per cent. This I have expressed in tabular form—

Table I.—Germinating Power of Rape Seed Sown with Superphosphate in—

Soil, air dried	77 per cent.
Soil with 10 per cent. moisture	64 per cent.
Soil with 15 per cent. moisture	80 per cent.
Normal germination	81 per cent.

"A set of field experiments was then conducted on similar lines to those on which the foregoing laboratory tests were based. Throughout the autumn of last year, each week, was planted a small plot of rape with superphosphates, and alongside it a similar plot without super. By continuing this process for three months it is evident that the different plots were made to encounter a large variety of germinating conditions, both with respect to weather and soil moisture. A careful weather record was kept throughout this period. Each week also samples of soil were taken and their moisture content determined, in order to correlate these tests with those already conducted in the laboratory. The tabulated results of all these tests I have thought unnecessary to introduce here. They were in general confirmatory of the others. Thus the earlier sown plots—those which went into dry soil during the warm spell in March—came away after the first rains equally as well as those which had been planted immediately before, and some of the former had then lain for eight weeks without rain. The first batch of plots to germinate were not favored with a good soaking downpour. The first rains which fell (in the second week in May) were light; 12 points on the 9th, 4 on the 11th, 2 on the 12th, and 16 on the 13th. Drying winds intervened between the showers. The soil was thus for that week kept in that doubtful condition always to be avoided when seeding. Germination commenced on the 16th, and in each of the plots sown with superphosphate was less than in the untreated plots. The seeds planted in each originally were of course counted and the young plants again counted and removed as they showed above ground. In no case was the loss greater than 25 per cent. Of the plots which were planted subsequently, some of course, experienced poor germination conditions and suffered in consequence. A few received soaking showers immediately

after planting, and others were planted in thoroughly moist soil. In the latter cases there was little or no difference between the plots treated with superphosphate and those not so treated. In addition to this series of plots set in the loam previously mentioned, I also planted a corresponding series in limestone soil. The latter was a whitish soil situated on a rubbly limestone ridge—a formation often met with in the mallee country. This soil of course contained a large proportion of carbonate of lime, 12 per cent. as against 1 per cent. in the loam. And in accordance with the well-known neutralising effect which lime has upon superphosphate, little or no injury was suffered by the seed sown with super. in this soil. Even in the cases of those plots which experienced the worst conditions for germinating there was no appreciable difference between the manured and unmanured sections. The nature of the soil is thus of considerable importance in this respect. However, as the majority of the soils of South Australia contain only the normal quantity of carbonate, attention was chiefly directed to the loam, as representing these soils.

STRIKING RESULTS.

“So far, then, although it has been shown that super. under certain conditions injuriously affected the seed in the ground, there is nothing to account for the total failure of a crop. In all the foregoing tests seed was not allowed to come into contact with super. until, at most, a minute or two before planting. Such a precaution cannot, of course, be taken in the field. The tendency would be, at the commencement of operations, to mix a supply of seed and super. sufficient for, perhaps, a day or two's work. A series of tests was therefore planned to correspond with such a practice. In this series far more striking results were obtained, and it seems probable that where seed suffers injury from the effects of super. the cause is to be sought for in the treatment of the seed before it reaches the soil, rather than in the condition of the soil at the time of seeding. In the first place, using the same super. as in previous tests, 10 lots of 100 seeds were each mixed with a small quantity of the super. and placed in small stoppered bottles. After the lapse of one day the seed from the first bottle was removed and its germinating power tested in the usual way; after two days that from the second bottle was tested, and so on, up to the tenth day. These lots of seeds showed a rapid falling off in germinating power, thus: that which had stood for one day only was apparently little affected; each successive lot, however, gave a lower germination, until that which had stood for six days and all subsequent lots showed no signs of vitality whatever and failed to germinate. This test was repeated twice with similar results. Then, to ascertain whether equally drastic results would occur if other brands of superphosphates were used, similar tests were conducted with two other supers. which had been used on the farm during the seeding just completed. These were even more

destructive than the first. In one case practically all seed was killed within three days, and with the other in one day. These results I have also set out in tabular form.

" *Table II.*—Germinating power of rape seed mixed with superphosphate before planting—

Super.	Moisture Content.	Period of Standing.				
		1 Day.	2 Days.	3 Days.	4 Days.	5 Days.
I.	6.7 %	75 %	44 %	15 %	5 %	2 %
II.	9.7 %	44 %	23 %	5 %	5 %	—
III.	13.3 %	1 %	—	—	—	—

" The three superphosphates used in these tests were submitted to a careful analytical examination, and the only essential particular in which they greatly differed was in the moisture content. This I have also shown on the table.

" No. I. was a good free-running super., apparently quite dry to the touch and friable in texture.

" No. II. had just sufficient moisture to give it a slightly sticky consistency. When pressed between the fingers it adhered in a flat cake-like mass.

" No. III. showed still more stickiness. It was still sufficiently free to run well through the manure box of the drill, but was in that condition in which a super. sticks to the stars and necessitates an occasional scraping and cleaning of the mechanism. I wish to point out that this super. would certainly not be rejected as being too wet to drill. Nevertheless, it contained enough moisture to render its effect fatal to rape seed with which it was mixed within 24 hours. It might quite possibly happen that a farmer would mix his seed with such a super. and commence drilling straight away. Supposing the ground to be at the time moist and in good seeding condition, seed which was sown immediately would be comparatively unharmed and might germinate well. Any seed, however, which stood in the super. till later in the day, or overnight till next morning, would suffer more or less severely, and might even have its vitality destroyed altogether. In such a case, then, a total failure of the crop might occur and the reason might not at first sight be obvious. On the showing of these tests, however, such failure might have been averted by paying attention to the constituency of the super.

used, and also more particularly to the time which elapsed between mixing and sowing. In extension of this section of the experiment I conducted further similar tests with superphosphates Nos. II. and III. In these, however, I allowed the seed to remain in the super. for shorter periods, namely, four hours, eight hours, 12 hours, and so on up to two days. In this way I found that seed might be left in super. No. II. for eight hours without suffering appreciably; though in super. No. III., even after four hours, a considerable loss occurred. A super. of this type, therefore, may be looked upon as being quite unsuitable for this purpose. To ascertain whether other small seeds were similarly affected when mixed with super., I repeated the test with other varieties of seeds. These I will summarise by saying that kale seed, similar both botanically and in point of size to that of rape, suffered to about the same extent as the latter. *Phalaris commutata* was more resistant and withstood the injurious effect of the super. for three days, where rape had been killed in one day. Lucerne, again, was still more resistant, and was not greatly affected within four or five days. Hence the conclusions arrived at apply in strictness only to rape and closely allied seeds.

THE POSITION SUMMED UP.

"As I mentioned in my introduction, the foregoing is only an outline indicating the lines upon which this experiment was conducted, and I cannot now do better than quote from the original report the general conclusions at which I arrived. These results appear to indicate that the practice of drilling small seeds with superphosphate may possibly be conducted in such a way as to secure a normal germination, with certain restrictions; and in practice the precautions likely to lead to best results may be stated as follows:—(1) The superphosphate should be the driest obtainable; the moisture content should not exceed 10 per cent. (2) Drilling should be completed as soon as possible after the seed has been mixed with manure, preferably the period elapsing between the times of mixing and planting should be not more than four hours. (3) The soil, at the time of planting, should be either thoroughly moist and in a favorable condition to promote healthy germination or quite dry, *i.e.*, air dry. In the latter case there is a certain amount of risk, in that the soil may be brought to a malting condition by the intervention of light rains before it receives a thorough soaking. In conclusion, I wish to state that throughout the work I had the advantage of being able to consult with Mr. Colebatch on points of difficulty as they arose. I also wish to record my thanks to Mr. Alcock and Mr. Spafford, of the College experimental staff, for incidental assistance which was always willingly rendered."

Mr. Summers said he had listened to the address with the utmost interest because of various experiences of a somewhat similar character to those described, which had come under his notice. He well remembered the failure

of the rape seed sown on the departmental plot on Mr. Pengelly's farm. The seed was supplied by the department, and afterwards some strong comments were made regarding the action of the department in sending out old seed. A second lot of seed was supplied, however, and came away well. Subsequently Mr. Pengelly admitted that he believed the initial failure was due to the seed having been sown late in the afternoon, after it had been mixed for some hours with the fertiliser. He knew of others who, after personal experience, had come to a like conclusion. He would like to know to what Mr. Birks attributed the injury to the seed. Was it caused by the acid in the superphosphate? In reply, Mr. Birks said he was convinced that the non-germination was primarily due to the mono-calcic phosphate, the essential constituent of superphosphate. A hearty vote of thanks was accorded to Mr. Birks for his excellent paper, and the Minister of Agriculture added a graceful and merited eulogy. Mr. Birks, he said, was a young man of great promise, and personally he was pleased to have in the Agricultural Department such an officer. "I wish," concluded the Minister, "we had more men of his stamina and standard to take the place of the older men who must in time move out, and I desire in this public way to congratulate him upon his admirable paper."

POULTRY-RAISING.

The Poultry Expert (Mr. D. F. Laurie) held the platform for half an hour, and handed out facts and figures which carried conviction. Contrary to popular opinion, he said, the South-East generally was well suited to the production of eggs and table poultry of high quality. Among others, Messrs. Moritz Bros. had demonstrated in a striking manner the success that could be achieved by careful breeding, housing, and feeding. Good housing was most essential in a cold climate, otherwise much of the food consumed went to sustain animal heat, with a consequent reduction in the supply of eggs. Another desirable provision was thief and fox proof yards. Dealing with the question of foods, the speaker laid stress upon the value of oats and other products. In the food test trials at Kybyholte the pullets fed on oats had laid more eggs than those in any other pen. Rye had also proved a capital provender. It was encouraging to know that in the matter of markets no other industry had a more hopeful outlook than the poultry business. It was the declared intention to again exploit the London markets with shipments of eggs next spring, and in that connection the cordial co-operation of all poultry-keepers was earnestly desired. He recommended farmers to stock a good proportion of varieties of fowls, such as the Orpingtons and Wyandottes, in view of the excellence of these birds for table purposes, both for the house and the export markets. In conclusion, Mr. Laurie described the efforts that were being made by the Government to successfully promote the poultry industry generally and the best interests of the breeders individually. Replying to inquiries, Mr. Laurie said it was not advisable to give

peas or barley to fowls in the summer, as they were too heat producing. It was well to scald bran before feeding, otherwise it was too vigorous in its mechanical action. Sunflower seed was excellent food at moulting time—a period when the birds should be particularly well fed. The most useful cross for the table was the White Leghorn cock and the Black Orpington hen. For egg production, however, only pure bred birds should be maintained.

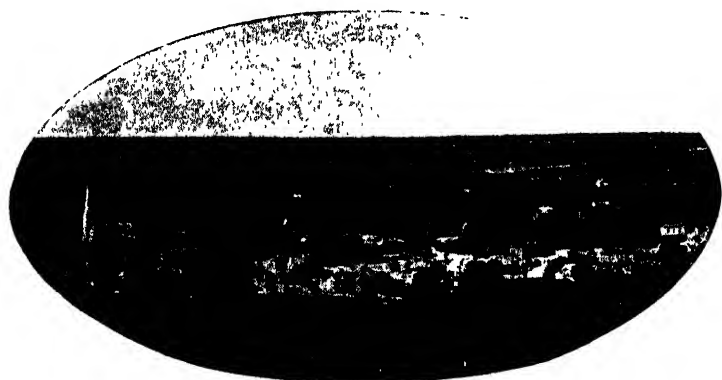
ADVICE TO DAIRYMEN.

A capital address was given by the Dairy Expert (Mr. P. H. Suter), who stated that the dairying industry had never before been in a more satisfactory position. During the 1903-4 season 5,995,750lbs. of butter, worth £250,000, was manufactured, and he felt sure that the figures for 1910-11 would show over 10,000,000lbs., worth approximately £440,000. The season just closing constituted a record. Much greater expansion was possible, but it depended upon the landholders paying more serious attention to the two cardinal points—breeding and feeding. A good bull was half the herd, and feeding was well said to be equally as important as breeding. There was also room for improvement in the quality of a large percentage of the butter. The cream must receive more careful treatment by the adoption of clean methods and early delivery to manufacturers. Under existing conditions much of the butter made on the farms was inferior. By an all-round improvement in the quality the dairyman would receive an increased return of £30,000 per annum. He pleaded with the farmers to more fully recognise the benefits which would follow the practice of breeding and feeding upon better milk-making lines. Breeding from pure bulls of great milk merit on their ancestors' sides was important; but much enhanced returns would be more quickly secured by a judicious and liberal food ration being supplied. The annual yield per cow per annum in South Australia was about 200galls.—truly a non-profitable average. There were too many cows that never had an opportunity to show how much milk they could secrete, simply because they never received sufficient food. That was, to say the least, cruel, and the milking of such cows discouraged children on the farms. He strongly recommended the feeding of oaten hay, root crops for winter, and barley and oats for early feed in winter. Maize, sorghum, and lucerne should be given to supply succulent milk-producing fodder for summer. Ensilage should be given greater attention. There was a large area of country in the State which could be made to give profitable returns under mixed farming methods. This could be successfully effected by drainage, the free use of the plough, and manures. He instanced one farm near Penola, which was purchased at £7 per acre, and which, now planted with rye grass and clover, was equal to the £40 land in the western district of Victoria. There was a limited area of ideal dairying country at Mount Gambier and Glencoe. At Mount Gambier Mr. Ruwoldt had secured dairy returns equal

to anything in Australia; with three cows on six acres he had taken milk valued at £40 in seven months. He had secured that result by growing rye grass and clover, and manuring liberally with bone manure. Speaking generally, dairying work in South Australia could only be carried on profitably in conjunction with mixed farming. He outlined methods of management in the milking yard and in the factory. He condemned the use of preservatives in cream, and advised dairymen to remember that it was a duty to themselves and to the industry to produce a good flavored cream and butter. Their aim should be to breed and cull for improvement of herd, and to feed properly and maintain cleanliness in handling products, to improve quantity and quality of products. There was room for improvement on these lines, to increase the annual returns to cowkeepers by £200,000. Mr. Sandford warmly commended Mr. Suter for the clear and effective manner in which he had stated the position, and heartily indorsed the remarks. A great difficulty from the standpoint of the manufacturers was that they received a quantity of stale cream, from which it was utterly impossible to make other than third-grade butter. Questioned by Mr. Sandford, Mr. Suter said cream should be forwarded to the factories not less than twice a week during the winter and three times a week in the summer.

THANKS TO ALL.

At the instance of Mr. S. H. Schinckel a comprehensive vote of thanks was accorded to the Minister, the experts, and the other speakers, and also to the Naracoorte Branch for its hospitality.



POULTRY-KEEPING.

OPERATIONS FOR JUNE.

BY THE POULTRY EXPERT (MR. D. F. LAURIE).

Egg-production in Cold Weather.—The abnormal weather which characterised the season from January onwards has resulted in many disappointments as regards autumn and winter egg-production. The recent high prices—on one occasion a record for many years—point to some unusual cause. It was not due to the weather that the scarcity of eggs was so marked. The cause is undoubtedly the backward state of the pullets which, in ordinary years, would have been in full lay. In former times, say 25 years ago, the modern breeds—Leghorns, Wyandottes, and Orpingtons—were unknown, with the exception of a few Leghorns. The majority of hens and pullets did not lay in the autumn (moulting season) and winter, and, in consequence, the prices of eggs at those seasons of the year were high. During the last decade there has been steady improvement in the laying powers of the average hen. The improvement is due primarily to the introduction of the modern breeds, and principally to the distribution of modern laying strains. Under our conditions, there seems to be good reason for assuming that a normal, hot summer and early autumn are necessary, in order that early maturity may enable our pullets to settle down to consistent laying during late autumn and winter. Normal, hot summers generally force an early moult, so that the older hens have their new plumage and begin to lay again by about April. The long, cool summer has prolonged growth and retarded maturity; the moulting season was deferred until later than usual, and was much prolonged; hence the present unsatisfactory state as regards egg-production. Had our breeders been forewarned they would have been in a position to amend matters.

Scratching-shed Houses.—In New Zealand and Victoria, where the winters are more severe than in this State, those breeders engaged in market egg-production recognise that ordinary methods of housing and feeding will not conduce to high egg-production. In America, in the very cold portions, egg-production in winter is satisfactory, because the breeders have solved the question of feeding and housing. The poultry breeders of South Australia

live in districts differing materially as regards climate. In the North, except in wind-swept localities, the days are generally warm, although very often the nights are intensely cold. Ordinary good housing will, in these localities, insure good laying on the part of the hens. In the Hills districts and the cold South-East the stock thrive in standard houses, but the egg yield is considerably affected in cold, wet weather. The scratching-shed houses, which I have advocated for so many years, should be in universal use, with necessary local modifications, as far as housing the stock for market egg-production. Where space is limited, as in suburban poultry yards, the stock of laying birds will practically spend their life in the scratching-shed houses. These need be but little different to the pattern of house in use at the poultry stations. A house and shed combined of the following dimensions will accommodate 15 to 20 hens for the year:—Length, 18ft. (roosting portion 6ft., scratching shed 12ft.); width, 6ft. 6in. (roof, iron, 7ft. sheets); height in front, which should if possible face the north, 6ft.; height at back, 4ft. to 5ft., according to owner's height. There should be along the front a scratching board 9in. x 1½in., and there should be a hinged hood in front of the roosting compartment, and two narrow hoods 24in. wide—one at the top and one at the bottom of the scratching-shed portion. The top hood should be hinged so that it can be used as a verandah to protect the shed when rain is drifting in. The bottom hood should be hinged so that it can be dropped down in fine weather. The floor should be raised above the ground level, well and solidly rammed. On this spread a light cement reinforced concrete floor about 2in. thick. To do this, spread the concrete to the depth of 1in. over the floor; upon this lay a piece of stout wire netting, peg down, and then add the remainder of the concrete. Ram well, and then trowel to a level surface. A very convenient arrangement is as follows:—Separate the roosting portion from the scratching portion with a 12in. x 2in. jarrah board, or a slab of reinforced concrete made as above and allowed to set for a week or so. Fill in with soil to the height of the division, and then put in the cement floor. The roosting portion will then be 12in. above the level of the scratching-shed, and is easily cleaned. Spread a few inches of sand on this roosting platform where the greater quantity of the excreta will be deposited by the hens. The scratching portion is floored with a few inches of soil or sand on the concrete, and then the scratching litter is added. Use clean straw litter, *not* horse manure. The mash dish and water vessel may stand upon small concrete stands conveniently placed, and, if desired, accessible from the outside. The advantages of the concrete floors are many. The chief one is that soil contamination is avoided; only that soil which is placed upon the concrete becomes tainted and should be renewed at intervals. When doing so the cement should be disinfected. This will give a perfect house as regards hygiene, ease of working, and high egg-production. I strongly advise that the floors of all permanent poultry houses be concreted.

A handy man can make slabs of any convenient size, using a mould, and can erect his houses completely of reinforced concrete. They are cool in summer, warm in winter, and everlasting.

For the Hills and South-East.—The house described will answer well, but I believe a modification would give increased returns and effect a saving where large numbers of fowls are to be kept. I should erect long houses, say, 25ft. long, for 100 laying Leghorns—width 15ft. to 17ft. Height in front, 8ft.; at back, 5ft. Two roosts the length of the house would run along the back, with a dropping board to receive the excreta running the full length and of sufficient width. This should be framed and covered with plain black iron tarred two coats (hot). The front should be open and wire netted, but provided with oiled calico shutters, to close in the front on cold wet days and at night. The ventilation would need careful adjustment; the birds need warmth and protection, not overheating and coddling. The floor of this house is raised, all one level, and floored with reinforced concrete 3in. thick. On this put 3in. or 4in. of light soil, then 6in. of scratching litter which must be frequently added to. Mash troughs and water vessels are on raised platforms in the centre, and nest-boxes under the droppings board. A door each end gives ingress and egress. This house is for layers only, and they remain there, except on fine days, when they may be allowed their liberty. Large runs may surround these houses, or they may be placed at a good distance apart. I hope to erect one or more houses on this principle at Kybybolite, as I am convinced there is need of such accommodation in the South-East and the hills. I need hardly point out that it would be folly to expect any but selected hens and pullets to lay well in this or any other pattern of houses.

Unsuitable Accommodation—The need of improved accommodation for poultry is very evident. It frequently happens that reports reach me which show that the unfortunate poultry are often kept under barbarous conditions. There is need of action to compel people to keep the stock under more humane conditions. Breeders who are so cruel and slovenly are of no value as regards the poultry industry, and it would be infinitely preferable if they refrained from keeping poultry. If you have good fowls and feed them intelligently, it is only reasonable to house under the best conditions if the best results are desired. The rule should be fewer fowls but of the best quality; intelligent use of the best foods. The result will be satisfaction and ease in working.

Food.—An inspector reported that one breeder, young and inexperienced, had purchased a quantity of damaged and mouldy poultry food. His stock was in a very neglected and unhealthy condition. The use of such food is the cause of many diseases, generally confounded with roup. There are several diseases of poultry due to fungoid invasions—the fungi (moulds, &c.)

coming from damaged foods. Ignorant people use such foods, lose their poultry, and then declare that the keeping of poultry is not profitable. The industry is better without such persons.

For fowls kept in the scratching-sheds as described the feeding may be as follows :—

Mash.—Bran, one part ; pollard, two parts (according to quality), mixed with meat-meal soup, to which add a little salt. Give morning or evening as convenient. Feed in pans or troughs, which must be scrupulously clean.

Grain, in good variety, may be scattered in the scratching litter, which must be deep enough to compel the birds to work hard all day. Use none but of the best quality ; do not be tempted to buy or use rubbish. Poultry spices, mustard, ginger, &c., have their uses as tonics or medicines in emergency. The regular use of all such is absolutely wrong, and is only advocated by those who wish to sell to misinformed poultry-breeders. There need be no misapprehension upon this point. Keep good, sound stock, house them well, and feed them upon good food in variety, and any spice or such will be superfluous and injurious. There is no royal road to success. All things must be done properly and in order.



EXTRACTS FROM TRADE COMMISSIONER'S REPORT.

BUTTER.

" The market is practically the same as last reported, with the exception that probably the very finest is a little firmer, but seconds are quite as hard to dispose of as for the past few weeks.

FRUIT.

" When in Floral Hall one day this week I noticed that pears were being sold *ex Orontes*, 'all faults' at from 3s. to 5s. per bundle. This method of disposing of pears is to my mind most detrimental to the Australian business, as it has an undoubtedly weakening effect on the market. I consider that the proper method is the one I am adopting myself, and that is that when fruit arrives in this condition it should be immediately re-packed and all rotten fruit taken out. It is certainly not a good thing to let the whole of the trade know when fruit arrives in this condition.

" I have not yet quite cleared *Orontes* apples, but we are making from 14s. to 15s. for *Cleopatras* and 15s. to 17s. for *Jonathans*, which I trust will be considered satisfactory when compared with sales made by other people. The Arctic weather we have been having has almost put a stop to the fruit trade.

" With regard to the special case of *Jonathans*, packed by a client, I have obtained 22s. 6d. for this particular case, and I trust this will be some encouragement to shippers to adopt to a certain extent this method of packing. When lecturing in South Australia to the fruitgrowers I told them that there is always a sale for a limited quantity of specially graded and packed fruit, for which some of our best buyers would be prepared to give the additional price, and I take it that the difference between the price I have obtained for the special case and that ruling for fair average quality fruit will more than compensate for the trouble taken.

WEST AUSTRALIAN FRUIT.

" It will no doubt be reported that very high prices have been obtained for some West Australian fruit which has been on the market this last week. While I am prepared to admit that the fruit was exceptionally fine, yet, at the same time, I trust the growers will not be misled by these prices. There is no doubt that it is one of the tricks of the trade, and prices have been returned with some ulterior object, as no one could possibly say that any profit could be made out of the fruit at the price realised on the market; that is, of course, in anything like a commercial quantity.

BEES AND FRUIT PRODUCTION.

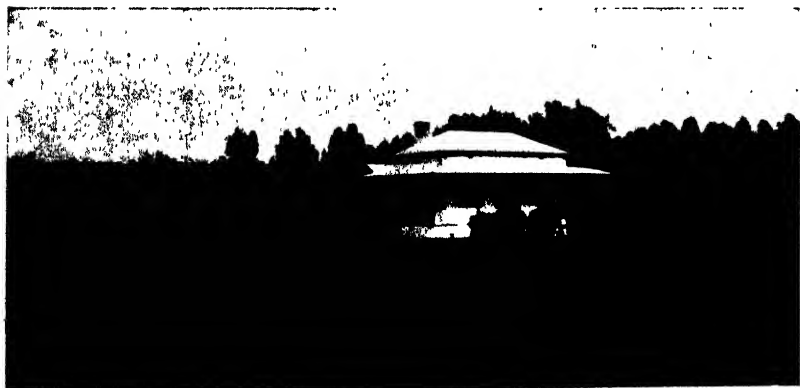
"As I know a good deal has been said in South Australia in regard to the importance of all fruitgrowers also encouraging the bee industry, I would like to point out that considerable experiments were carried out in England last year in this regard, with the result that it is now considered that bees are absolutely essential to the safe setting of fruit. One of the experiments adopted was to cover over several gooseberry bushes with a fine net when they were in flower, thus preventing the bees from approaching them. While other bushes in the same garden that were not so covered had a good crop of fruit, the fruit on the bushes which were protected from the bees, with very few exceptions, came off.

ONIONS.

At the present time Egyptian onions are selling at from 6s. per cwt., and Valencias at from 4s. to 5s. per cwt. It is anything but a good market for onions at the present moment, and the prospects are certainly not bright. Under the circumstances I do not recommend shipping from South Australia this year.

APPLES.

"I am advised that the first consignment of apples to arrive in Hamburg this season was 100 cases ex *Orontes*, which sold at from 14s. to 18s. per case. The quality was not what it might have been, otherwise better prices would undoubtedly have obtained."



FRUIT SALES IN EUROPE.

APPLES.

The General Manager of the Produce Department states that the Trade Commissioner has already forwarded account sales for the following shipments of apples, and the results given have proved highly satisfactory to growers :—

Orontes.—Sailed February 24th ; sold early April :—Cleopatras—(A), 14s. ; (AA), 14s. to 16s. ; (AAA), 14s. Jonathans—(A), 15s. 6d. ; (AA), 15s. to 16s. 6d. ; (AAA), 17s. ; (specially packed), 22s. 6d.

Macedonia.—Sailed March 2nd ; sold middle April :—London Pippin—(special), 16s. ; (AA), 13s. 6d. to 14s. ; (AAA), 14s. to 15s. ; Jonathan—(A), 16s. ; (AA), 15s. ; (AAA), 13s. 6d. to 14s. 6d.

These prices have netted the growers an average of 10s. 3d. per case net as Port Adelaide.

The account sales for later shipments have not yet arrived, but cable advices of prices realised show that while the English and Continental markets have felt the effect of the arrival of the larger shipments, the results obtained by the department are very encouraging, and the net returns will be considerably above the previous two seasons, and in many cases above expectations.

PEARS.

Growers are suffering severe losses through the landing of shipments in an overripe condition, and the department had not up to the present been able to supply London clients with the good class of pear they require, and for which they are prepared to pay high prices. The position is that good sound pears would realise exceptional prices, and it is earnestly hoped that later shipments will arrive in good condition and retrieve the position.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the above Board was held on Wednesday, May 9th, there being present Messrs. J. W. Sandford (chairman), C. J. Tuckwell, C. J. Valentine, Colonel Rowell, Professor Perkins, G. R. Laffer, and J. Miller.

In reply to inquiry from previous meeting the New South Wales Department of Agriculture advised that washing soda as a preventive of scale on orange and lemon trees had been tested in two orchards, but the officers of the Horticultural Section could see no difference between the trees so treated and those untreated.

Belalie North Branch requested the support of the Board to the proposal that the Government should be requested to establish a veterinary college. It was decided to call the attention of the Branch to the action taken by the Board and published in October, 1910, *Journal*.

In reply to inquiry from the Board the committee of the Fruitgrowers and Market Gardeners' Association advised that it favored the use of the standard bushel fruit case being made compulsory.

The following gentlemen were approved as members of the undermentioned Branches :—Messrs. C. Casaretto, Mount Bryan ; E. Leishman, jun., Keith ; A. J. McAvaney, Wilkawatt ; A. Blum, J. Marshall, and J. H. Jericho, Lameroo ; M. Inglis and L. Hubner, Shannon ; R. J. Williams and F. P. Ayres, Meningie ; F. A. W. Konzag, G. Konzag, S. L. Dunning, and T. Worden, Mallala ; J. Shepherd, A. Hay, W. Shepherd, H. R. Shepherd, E. Shepherd, T. Critchley, R. Critchley, H. Pym, R. S. Talbot, H. C. Powell, R. Downing, H. Wooley, L. Wooley, J. Mills, and A. Mills, Kanmantoo ; G. Brooks, Mitalie ; E. J. Anderson, Minlaton ; G. L. Hawke, Kingscote ; J. F. Godfree, and C. O. Royal, Mount Pleasant ; W. G. Drewitt and G. H. Baumann, Paskeville ; E. Broadbent, Cherry Gardens ; H. G. Wright, G. Moller, H. C. Pyman, and A. J. Ireland, Hawker ; G. A. Wittwer, Whyte-Yarcowie ; J. S. Perry and J. C. Walter, Yallunda ; W. J. Colebatch and C. E. H. Schinckel, Kybyholite ; J. Orr, Kalangadoo ; E. Nilson and E. Gray, Millicent.

TELLING THE AGE OF A HORSE.

The four ways of telling the age of a horse were described recently by Professor E. L. Potter, of the animal husbandry department of the Oregon Agricultural College, in a lecture to his students, which was, in substance as follows :—

There are four ways of telling the age of a horse : by the skin of the cheek by the ribs, by the shrinking of the flesh of the tail, and by the teeth.

In a young horse the skin of the cheek is soft and elastic, and if raised up will immediately fly back in place. With an old horse, however, the skin is lifeless, and if it is raised up it will go back rather slowly.

The ribs of an old horse are apparently farther apart, and the space between them more distinct than in a young horse. First the space between the last two ribs becomes more distinct, then between the next two, and so on.

In an old horse the flesh of the tail shrinks, making the joints more distinct. This change begins at the end and works up year by year toward the body.

These three methods are not accurate, and merely enable one to tell an old horse from a young one. A skilful horseman can tell about as much regarding the age of a horse by his general appearance as by either of these methods.

The changes of the teeth are very much more reliable, however, and this method of judging is in almost universal use among horsemen. It is not absolutely accurate, but is sufficiently so for practical purposes, except in unusual cases.

The horse has 12 incisors or front teeth, six above and six below. He has two sets of these, one temporary and one permanent. When a colt is two years old he has all his temporary teeth. These will be shorter, whiter, and more worn than the permanent teeth.

At two and a half years the central pair, both above and below, drop out, and permanent teeth take their place. By the time the horse is three years old these permanent teeth will be fully developed and "in wear," that is, the upper and lower teeth will meet. At three and a half years the lateral pair of teeth (one on each side of the central pair), both above and below, drop out, and by the age of four the permanent teeth are in wear.

At four and a half years the corner pair, both above and below, drop out, and by the age of five the permanent teeth are all in wear. At this age the horse is said to have a "full mouth."

The teeth at this age are much longer from side to side than from front to rear ; also, on each one there is an elongated cup, or mark. This cup is a depression in the tooth and is lined with the same kind of hard enamel that

covers the outside of the tooth. It is also filled with dirt and foreign material, which gives it a black appearance. The lining of hard enamel will always distinguish the real cup from the artificial ones sometimes put in by jockeys.

At five there is a cup in each tooth. At six the cups in the central pair below have been worn away; at seven the cups in the lateral pair below are worn away; at eight, the corner pair; at nine, the central pair above; at ten, the lateral pair above; and at eleven, the corner pair above. The cups are then all gone, and the horse is said to have a "smooth mouth."

It must be remembered that the permanent teeth above and below came in at the same time, but that the cups above do not wear away until all the cups below are gone. It must be remembered, also, that the changes begin at the centre and continue at the rate of one pair a year; that a horse at maturity, which is at five years, has everything—that is, all his permanent teeth and all the cups. If one remembers this much, he has the whole thing in a nutshell. If the signs for any particular year are forgotten, one can count backward or forward from five and get what is wanted.

After eleven years the signs are not definite, but at about fifteen or sixteen the tops of the teeth become round instead of longer from side to side than from front to back. The tooth does not actually change, but the lower part of the tooth is a different shape from the top, and when the tooth wears down, the wearing surface gets to where the tooth is of a different shape than where wear first started.

At about twenty the surface of the tooth changes from round to triangular, with the longer dimension from front to rear. Also, when the horse gets old, the teeth have more slope when viewed from the side. The teeth of a five-year-old horse come almost straight together, while those of a twenty-year-old horse come together at a sharp angle.



Hayfield near Adelaide.

STALLION PARADES.

The programme of parades, at which stallions of three years and over will be examined for soundness and suitability for stud service, has been arranged for 1911 by the Chief Inspector of Stock (Mr. R. J. Needham). The parades on Eyre's Peninsula have already taken place. It is satisfactory to note that the new departure has been supported in a hearty manner by farmers and horsebreeders throughout the State, and it is expected that this year's parades will be well attended. The programme is as follows:—

Date.	Time.	Place.
MAY.		
Monday, 22.....	8-30 a.m.....	Colton
" 22.....	4-30 p.m.	Streaky Bay
Tuesday, 23.....	11-30 a.m.	Petina
Wednesday, 24.....	8-30 a.m.....	Denial Bay
" 24.....	11-30 a.m.	Penong
JUNE.		
Wednesday, 14.....	9 a.m.	Swan Reach
JULY.		
Saturday, 1.....	9 a.m.	Mannum
Monday, 3.....	4 p.m.	Pinnaroo
Tuesday, 4.....	2 p.m.	Lameroo
Wednesday, 5.....	3 p.m.	Laura
Saturday, 8-21.....	9 a.m.	Adelaide stallion sales
Monday, 24.....	12 noon.....	Burra
Thursday, 27.....	10 a.m.	Lipson
" 27.....	3 p.m.	Koppio
AUGUST.		
Wednesday, 2.....	10-45 a.m.	Balaklava
" 2.....	4 p.m.	Yorketown
Thursday, 3.....	9 a.m.	Minlaton
Friday, 4.....	10 a.m.	Jamestown
" 4.....	3 p.m.	Kadina
Saturday, 5.....	10 a.m.	Port Wakefield
Tuesday, 8.....	10-30 a.m.	Saddleworth
" 8.....	11-30 a.m.	Eudunda
Tuesday, 15.....	2-30 p.m.	Snowtown
Wednesday, 16.....	10 a.m. to 4 p.m.	Gawler
Saturday, 19.....	2-15 p.m.	Bordertown
Tuesday, 22.....	10 a.m.	Lucindale
Wednesday, 23.....	10-15 a.m.....	Naracoorte
" 23.....	10 a.m.	Cowell

STALLION PARADES—*continued.*

Date.	Time.	Place.
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SEPTEMBER.

Friday,	1.....	10 a.m. to 3 p.m.	Crystal Brook
"	1.....	2 p.m.	Penola
Saturday,	2.....	2 p.m.	Mount Gambier
Monday,	4.....	10-30 a.m.	Millicent
Tuesday,	5.....	10-30 a.m.	Kapunda
Friday,	8.....	2 p.m.	Wilmington
"	8.....	12 noon.....	Port Elliot
Monday,	11.....	10 a.m.	Two Wells
Wednesday,	13.....	9 a.m.	Adelaide
Thursday,	14.....	9 a.m.	Adelaide
Tuesday,	19.....	11 a.m.	Kingston
Thursday,	21.....	11 a.m. to 1 p.m.	Robe
"	21.....	4 p.m.	Moonta
Thursday,	28.....	10-30 a.m. to 3 p.m.	Strathalbyn
Thursday,	28.....	10 a.m. to 3 p.m.	Tarlee

OCTOBER.

Monday,	2.....	3 p.m.	Petersburg
Tuesday,	3.....	3-30 p.m.	Orroroo
Thursday,	5.....	11-30 a.m.	Hawker
Saturday,	7.....	2 p.m.	Quorn
Wednesday,	11.....	10 a.m.	Renmark
Friday,	13.....	9 a.m.	Wakerie
Tuesday,	17.....	2 p.m.	Clare
Wednesday,	18.....	10 a.m.	Maitland
Saturday,	21.....	1 to 2-30 p.m.	Willunga
Tuesday,	24.....	9 a.m.	Normanville
Thursday,	26.....	9 a.m.	Meningie



THE WHEAT MARKET.

Values took a downward tendency during May, and in the early part of June the price on trucks at Port Adelaide was 3s. 3d. per bushel. or 3s. 2d. at outports. Farmers are said in most cases to be holding tightly to the balance of their last year's crop.

The ruling factor just now is the rapidly maturing winter wheat crop of the United States, which, in the ordinary course of events, is available in Chicago in July and in Europe in August. Private advices received in London in May point to the probability of the winter wheat crop exceeding that of last year by 50,000,000bush. The area sown to spring wheat is reported to be about 1,000,000 acres more than last year, and in Canada the excess area is reckoned at about 1,250,000 acres.

Beerbohm's Evening Corn Trade List says on May 5th — "The world's shipments from August 1st, 1910, to April, 30th 1911, to European and non-European countries during the past three years have been as follows :—

	1910 11. Quarters.	1909 10. Quarters.	1908 9. Quarters.
Russia	20,300,000	21,395,000	7,090,000
Roumania and Bulgaria	10,000,000	4,325,000	3,900,000
U.S.A. and Canada ..	12,800,000	15,600,000	18,300,000
Argentina	8,000,000	5,300,000	11,300,000
Australasia	5,850,000	4,900,000	4,500,000
India	4,160,000	2,190,000	480,000
Sundries	1,450,000	1,400,000	1,250,000
Total	62,560,000	55,110,000	46,820,000

The requirements for the whole season were originally estimated at 76,000,000 quarters, but in the light of subsequent events this would appear to have been an underestimate, principally owing to the increased consumption of wheat necessitated by the comparative failure of the potato crop in several European countries. If the requirements be increased on this account to 78,000,000qrs., there would be left still to be shipped about 15,500,000qrs. for the three months May to July, or a weekly average of 1,200,000qrs., of which quantity about 1,050,000qrs. would be required by Europe and 150,000 quarters by non-European countries. If the official estimates of last year's crop were anywhere near correct, there is more than sufficient wheat left to cover these requirements, but at what price will depend very much on (1) how the growing crops progress and (2) whether the harvest is an early one or not."

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
May 10	Quiet ; easier ; February-March, 4 4½	3 5	3 6½ to 3 7	3 5½
11	April-May, 4 4½ ; Liverpool, Jan.-Feb., 4 5½	3 4½ to 3 5	3 6 to 3 6½	3 5
12	Firm, but inactive	Do.	3 6½ to 3 7	3 5 ; millers, 3 6½
13	March-April, 4 5½ ; April-May, 4 4½	Do.	—	—
15	February-March, 4 5½	3 4	3 7 to 3 7½	3 5½ ; millers, 3 7
16	—	Do.	3 6 to 3 6½	—
17	Steady, but quiet	Do.	3 6½	—
18	Dull ; easier	3 3	3 6½ to 3 6	3 4½ ; millers, 3 6
19	Dull ; Liverpool steady	Do.	3 5½	3 ½
20	Dull	Do.	—	—
22	Easier ; forward wheat, 4 5½	Do.	3 5	3 3½
24	Dull ; lower	Do.	3 5½	—
25	—	Do.	3 5	3 3½ to 3 4
26	Dull and neglected	3 3	3 5½	3 4½ ; millers, 3 6
27	No demand	Do.	3 5 to 3 5½	3 4
29	Quiet ; Liverpool firmer	Do.	—	—
30	—	Do.	3 5 to 3 5½	3 4
31	Dull ; arrived wheat, 4 4½	Do.	3 5½	3 3½ ; millers, 3 5
June 1	Quiet ; no demand	Do.	3 5	3 3½
2	Quiet	Do.	3 4½ to 3 5 ..	Do.
3	Dull and neglected	Do.	Do.	Do.
5	Steady ; Liverpool dull	Do.	—	—
6	—	Do.	3 3½	3 3½ to 3 4½
7	—	Do.	3 4½ to 3 5 ..	3 3½
8	Held for advance ; not active	Do.	3 5	Do.
	Market dull and neglected	Do.	—	—

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom-Continent, full cargo rates 26s. per ton (8½d. per bush.), Parcels, Port Adelaide to London or Liverpool, 28s. 9d. per ton (7½d. per bush.) ; to Continent, 25s. per ton (8d. per bush.) ; Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.) ; to Sydney, 10s. 6d. per ton (3½d. per bush.)
 SAILER FREIGHTS.—From South Australia to United Kingdom-Continent, 25s. 6d. to 27s. per ton (8½d. to 8½d. per bush.) ; to South Africa, 20s. per ton (6½d. per bush.)

RAINFALL TABLE.

The following table shows the rainfall for May, 1911, at the undermentioned stations, also the average total rainfall for the first five months in the year, and the total for the five months of 1911 and 1910 respectively:—

Station.	For May, 1911.	Av'ge. to end May.	To end May, 1911.	To end May, 1910.	Station.	For May, 1911.	Av'ge. to end May.	To end May, 1911.	To end May, 1910.
Adelaide	1.89	7.12	4.55	8.65	Hamley Bridge	2.01	5.55	4.85	7.61
Hawker	1.42	3.94	2.77	6.45	Kapunda	1.50	6.55	5.31	8.28
Cradock	1.40	3.70	2.41	5.84	Froeling	1.21	5.66	5.11	8.72
Wilson	1.37	3.90	1.99	7.30	Stockwell ...	2.28	6.10	6.43	7.85
Gordon	0.91	6.29	2.33	2.78	Nuriootpa ...	1.94	6.42	4.91	8.40
Quorn	1.45	4.44	2.51	6.05	Angaston ...	2.99	6.37	7.35	9.53
Port Augusta	1.42	3.77	3.90	6.05	Tanunda	3.22	6.89	8.18	8.61
Port Germein	1.60	4.77	4.39	7.68	Lyndoch ...	2.65	6.44	5.37	8.87
Port Pirie ...	2.57	4.79	5.76	9.40	Mallala	2.22	5.67	4.27	8.09
Crystal Brook	2.27	5.04	5.29	7.71	Roseworthy .	1.69	5.53	4.19	9.39
Pt. Broughton	2.30	4.81	5.22	7.53	Gawler	2.29	6.44	5.06	8.62
Bute	2.13	4.90	6.24	7.67	Smithfield ..	2.46	5.20	5.44	9.02
Hammond ...	1.98	3.84	5.46	6.51	Two Wells ...	2.14	5.69	3.98	7.41
Bruce	1.21	2.81	2.05	5.75	Virginia	2.69	5.96	4.90	8.00
Wilmington .	1.73	5.90	5.82	9.55	Salisbury	2.21	6.31	5.94	9.45
Melrose	1.78	7.57	6.39	13.52	Teatree Gully	3.13	8.82	6.33	11.23
Booleroo Cntr	1.68	5.02	3.28	7.66	Magill	2.77	8.47	6.22	9.15
Wirrabara ...	1.94	5.94	4.15	10.55	Mitcham ...	1.83	7.53	5.69	8.19
Appila	2.61	4.99	4.66	10.92	Crafrers	5.84	13.28	12.32	18.34
Laura	2.51	5.54	5.33	11.04	Clarendon ...	4.59	10.63	9.80	11.13
Caltowie	3.18	5.42	6.00	8.53	Morphett Vale	3.23	7.70	7.16	8.91
Jamestown ...	3.20	5.30	6.36	6.97	Noarlunga ...	3.90	6.65	7.84	8.04
Gladstone ...	2.58	5.00	5.73	7.96	Willunga ...	5.30	8.28	10.00	11.30
Georgetown .	2.67	6.06	5.91	7.53	Aldinga	3.72	6.48	6.37	8.68
Narridy	2.09	5.67	4.88	7.15	Normanville.	2.52	6.67	6.10	8.62
Redhill	2.12	5.32	4.76	9.67	Yankalilla...	3.59	7.37	7.08	13.69
Koolunga ...	2.14	5.02	4.85	8.99	Eudunda	2.11	5.28	5.82	10.77
Carrieton ...	2.42	3.90	3.20	9.12	Sutherlands ..	2.20	—	3.96	7.14
Eurelia	2.18	4.30	3.85	7.44	Truro	2.61	5.84	6.51	7.81
Johnsburg ...	1.90	3.15	2.97	6.40	Palmer	1.13	—	4.55	7.70
Orroroo	2.17	4.77	3.10	6.63	Mt. Pleasant.	3.78	7.92	7.86	8.90
Black Rook ..	2.87	4.26	4.06	7.74	Blumberg ...	3.23	8.38	7.54	9.70
Petersburg ...	3.14	4.41	5.11	6.42	Gumeracha ...	4.06	9.71	9.29	11.09
Yongala	2.75	4.38	4.70	6.30	Lobethal	5.25	9.67	9.33	11.02
Terowie	2.25	4.30	5.04	9.58	Woodside	5.66	8.53	9.75	11.95
Yarcowie ...	2.63	4.41	5.25	9.06	Hahndorf ...	6.67	9.63	12.81	14.43
Hallett	2.27	4.98	5.13	7.06	Nairne	6.54	8.51	12.92	13.38
Mount Bryan	2.22	4.43	4.94	7.90	Mt. Barker ...	6.82	9.27	11.77	13.22
Burra	2.50	5.62	6.09	9.12	Echunga ...	7.74	9.69	13.11	16.26
Snowtown ...	1.20	5.11	3.56	7.89	Macclesfield .	6.16	8.53	11.13	14.99
Brinkworth ...	2.06	4.54	5.05	8.71	Meadows ...	6.52	10.44	12.83	16.70
Blyth	2.06	5.52	4.80	7.39	Strathalbyn .	3.97	6.16	7.83	10.58
Clare	2.78	7.72	6.67	11.19	Callington ...	3.26	5.27	6.01	7.75
Mintaro Cntrl.	2.61	6.37	6.70	10.02	Langh'rne's B	2.83	4.96	5.22	7.00
Watervale ...	3.10	8.54	8.54	10.25	Milang	2.40	5.68	4.16	5.72
Auburn	3.26	7.82	7.75	10.57	Wallaroo ...	2.80	5.05	5.28	6.10
Manoora	1.99	5.71	4.68	8.49	Kadina	2.29	5.62	4.84	6.66
Hoyleton	1.96	6.28	6.38	6.20	Moonta	1.47	5.47	4.50	5.49
Balaklava ...	2.05	5.73	6.00	7.12	Green's Pins .	1.66	4.93	4.00	6.11
Pt. Wakefield	2.22	5.16	8.27	5.86	Maitland	2.44	6.66	6.91	6.34
Saddleworth.	2.53	6.75	5.06	8.43	Ardrossan ...	2.40	4.62	4.91	5.44
Marrabel	2.05	6.14	4.17	8.19	Pt. Victoria ..	2.32	5.25	5.70	5.42
Riverton	2.50	6.70	6.10	10.37	Curramulka .	2.40	5.67	5.41	7.14
Tarlee	2.35	5.89	4.90	8.81	Minlaton ...	2.68	5.43	5.44	7.37
Stockport ...	1.50	5.30	3.94	7.07	Stansbury ..	2.62	5.40	5.94	6.43

RAINFALL TABLE *continued.*

Station.	For May, 1911.	Av'ge. to end May.	To end May, 1911.	To end May, 1910.	Station.	For May, 1911.	Av'ge. to end May.	To end May, 1911.	To end May, 1910.
Warooka....	2.73	5.40	7.24	7.05	Bordertown..	1.20	6.03	5.43	7.02
Yorke town..	2.90	5.46	6.28	7.51	Wolseley....	1.20	5.42	5.81	7.63
Edithburgh..	2.46	5.54	4.83	8.02	Frances.....	2.25	5.79	7.44	7.70
Fowler's Bay.	1.54	4.28	3.20	3.38	Naracoorte..	2.11	6.65	7.36	9.51
Streaky Bay..	3.81	4.79	5.80	4.84	Lucindale...	1.89	6.65	7.43	11.37
Pt. Elliston..	2.73	4.60	4.86	4.29	Penola.....	2.49	8.16	9.91	11.89
Pt. Lincoln..	2.48	6.15	4.87	4.10	Millicent....	4.37	9.07	12.53	10.76
Cowell.....	3.35	4.47	4.69	5.59	Mt. Gambier.	4.30	10.02	13.13	11.79
Queenscliffe..	—	5.85	—	11.15	Wellington..	1.28	5.25	5.09	8.24
Pt. Elliot....	3.42	6.85	5.88	7.53	Murray Bridge	1.54	4.86	4.59	10.14
Goolwa.....	3.32	6.02	7.18	7.26	Mannum....	0.89	4.34	2.74	8.08
Meningie....	2.11	6.14	5.18	7.15	Morgan.....	1.31	3.33	4.16	5.22
Kingston....	2.81	7.48	7.75	10.20	Overland Crnr	1.96	4.17	6.21	7.91
Robe.....	3.24	7.47	9.25	9.41	Renmark....	1.66	3.60	6.35	6.47
Beachport....	4.01	8.16	10.79	10.30	Lameroo....	—	—	1.33	6.42
Coonalpyn..	1.55	5.35	5.16	6.70					

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on June 1st—

BUTTER.

The supply of cream showed a falling off during the main portion of the month, but towards the latter end the quantity and quality have both improved. The demand for butter has been very active, but prices have only increased slightly, viz., superfine, 1s. 1d.; pure creamery, 1s. per lb.

Messrs. A. W. Sandford & Co. report on June 1st:—

BUTTER.—An active month's business experienced. Best factory and creamery, fresh in prints, 11½d. to 1s. 1d.; second-grade factories, 9½d. to 10½d.; choice separators, dairies, 11d. to 1s.; medium quality, 9d. to 10d.; stores and collectors', 8½d. to 9d.

EGGS.—A decidedly firmer market ruled throughout; prime, guaranteed new-laid, hen, 1s. 7½d.; duck, 1s. 8d.; ex refrigerator, 1s. 4d. per doz.

CHEESE.—Brisk demand, but only for mild-flavored or newer makes; old season's neglected. Mild flavored, 5½d. to 6½d.; aged and dry, 3d. to 4d. per lb.

BACON.—Factory-cured sides, 6½d. to 7½d.; middles, 7d. to 7½d. per lb.

HAMS.—In calico, 8d. to 9d. per lb.

LARD.—In skins, 6½d.; tins or bulk cases, 5½d. per lb.

HONEY.—Prime clear extracted, new season's, 2½d.; dark sorts, 1d. to 1½d.; beeswax, 1s. 1d. per lb.

ALMONDS.—Soft shells, Brandis, 6½d.; mixed soft shells, 6d.; hard shells, 2½d.; kernels, 1s. 1½d. per lb.

LIVE POULTRY.—Good table roosters, 2s. 9d. to 3s. 3d. each; plump cockerels, 2s. to 2s. 6d.; hens and light cockerels, 1s. 4d. to 1s. 9d.; ducks, 3s. to 3s. 6d.; geese, 3s. 6d. to 4s. 6d.; pigeons, 9d.; turkeys, 7d. to 10d. per lb., live weight, for fair to good table birds.

POTATOES.—With heavy yields this season in the South-Eastern districts, growers are anxious to reduce stocks. Locals, £4, Adelaide; Gambiers, £3 7s. 6d. to £3 12s. 6d. on trucks, Adelaide or Port, per ton of 2,240lbs.

ONIONS.—In full supply; locals, £3, Adelaide; Gambiers, £3 5s. to £3 10s. on trucks, Adelaide or Port, per ton of 2,240lbs.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		June.	July.			June.	July.
Amyton	1091	—	—	Merghiny	*	1	6
Angaston	*	10	8	Millicent	1115	13	11
Appila-Yarrowie	*	—	—	Miltalie	1102	10	8
Arden Vale & Wyacca ..	*	—	—	Minlaton	*	17	15
Arthurton	*	15	—	Mitchell	*	10	8
Balaklava	*	10	—	Monteith	*	—	—
Beetaloo Valley	*	—	—	Moonta	*	—	—
Belalie North	*	10	8	Morehard	1092	—	—
Blyth	1097	13	—	Morgan	1105	10	8
Bowhill	*	—	—	Morphett Vale	†	20	—
Bowmans	*	8	6	Mount Bryan	1095	10	8
Bute	*	—	—	Mount Bryan East	1094	3	1
Butler	*	—	—	Mount Gambier	1115	—	—
Caltowie	*	10	8	Mount Pleasant	1112	9	14
Carrieton	*	8	6	Mount Remarkable ..	*	8	5
Cherry Gardens	1106	6	11	Mundoora	†	—	—
Clare	1098	9	7	Murray Bridge	*	—	—
Clarendon	†	12	10	Nantawarra	*	7	5
Colton	†	10	8	Naracoorte	1115	10	8
Coomooroo	*	12	10	Narridy	†	—	—
Coonalpyn	1104	—	—	Northfield	*	6	11
Craddock	*	—	—	Orroroo	*	—	—
Crystal Brook	*	—	—	Parrakie	1106	3	1
Cummins	*	10	8	Paskeville	*	8	6
Davenport	1091	—	—	Penola	1117	3	1
Dawson	1091-2	—	—	Penong	†	10	8
Dingabledinga	*	9	14	Petina	*	—	—
Dowlingville	†	—	—	Pine Forest	*	6	11
Elbow Hill	*	—	—	Port Broughton	*	9	7
Forest Range	1107	8	6	Port Elliot	*	17	15
Forster	1104	1	—	Port Germein	*	—	—
Frances	†	9	7	Port Pirie	*	3	1
Freeling	†	—	—	Quorn	1092	10	—
Gawler River	1099	—	—	Redhill	*	6	11
Georgetown	1094	10	8	Renmark	*	—	—
Geranium	1105	24	29	Saddleworth	1100	16	21
Green Patch	†	5	10	Salisbury	1100	6	4
Gumeracha	1108	5	10	Shannon	1102	—	—
Hartley	1109	10	8	Sherlock	†	17	—
Hawker	*	12	10	Stockport	*	—	—
Hookina	*	10	8	Strathalbyn	*	19	17
Kadina	*	8	6	Sutherlands	*	—	—
Kalangadoo	1113	10	8	Tatiara	1117	—	1
Kanmantoo	1109	10	8	Uraidla and Summert'n	1112	5	3
Keith	*	10	8	Utera Plains	1103	10	8
Kingscote	*	6	4	Waikerie	1106	—	—
Kingston	†	24	29	Watervale	*	—	—
Koppio	1101	8	6	Wepowie	*	—	—
Kybybolite	*	8	6	White-Yarrowie	1095	10	8
Lameroo	*	—	—	Willowie	*	2	—
Lipson	*	—	—	Willunga	1113	3	1
Longwood	1110	7	5	Wilkawatt	*	10	—
Lucindale	1114	—	15	Wilmington	*	7	5
Lyndoch	1110	8	6	Wirrabarn	1093	—	—
Maitland	1100	3	1	Woodsides	†	14	—
Mallala	*	5	1	Yadnarie	1103	10	8
Mannum	*	24	29	Yallunda	*	—	—
Meadows	1111	10	—	Yongala Vale	1097	3	8
Meningie	1111	10	8	Yorketown	*	10	8

* No report received during the month of May.

† Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, April 18.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. O'Donohue (chair), Wallace, Coicoran, Cormack, and Thomas (Hon. Sec.).

BULK-HANDLING OF WHEAT.—Some discussion took place concerning bulk-handling of wheat. Members considered that if there was really a substantial saving in the cost of handling, and if as good a price could be realised for the bulked as the bagged wheat, the initial cost should be no bar to the installation of the better system.

Davenport, April 13.

(Average annual rainfall, 9 in.)

PRESENT.—Messrs. Gosden (chair), Holdsworth, Bice, Rogers, Smoker, Roberts, and Lecky (Hon. Sec.).

WHEAT-GROWING.—A few practical hints in connection with wheat-growing in this part of the State were given by Mr. Roberts. Seed wheat, he said, should be of the very best procurable. It should be chosen with due regard to the nature of the soil, whether sandy, of a limestone nature, or a heavy loam. In these dry northern districts very hardy varieties of wheat, which held the grain well, gave the best results. It was a great mistake to harvest wheat before it was properly ripe, as if bagged when unripe weevil were far more likely to give trouble. He had seen some wheat after last harvest which had only been in the stack for three months, and the weevil were so numerous that the grain could not be shipped.

Davenport, May 11.

(Average annual rainfall, 9 in.)

PRESENT.—Messrs. Roberts (chair), Hobby, Smoker, Bice, Nestor, and Lecky (Hon. Sec.).

GARDENING.—Mr. Smoker gave an address on "Gardening," more particularly in the North. He was of opinion that a large quantity of the land this side of the range was suitable for fruit-growing; and if properly utilised was capable of carrying a large population who could be employed in drying and canning the fruit. He gave an exhibition how trees and vines should be pruned, explaining the different methods according to the variety. He also showed the different ways of grafting and budding, and extended a hearty invitation to members to visit his property at Stirling North.

Dawson, April 8.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. Meyers (chair), E. W. and S. Smart, Hughes, Baker, Wilson, Ferguson, Burden, and Nottle (Hon. Sec.).

HOW TO PREPARE THE SEED FOR SOWING.—Mr. G. Ferguson said he preferred to have good, clean seed, and if possible to have it graded. He would pickle his seed whether sowing in wet or dry soil, and dip the bags; and after draining them let 14 days elapse before sowing with a drill, as sowing before it was dry would spoil a lot of the seed. He preferred to sow about 1 bush. to the acre. Mr. E. W. Smart pickled his wheat on a floor and sprinkled the bluestone on it and turning the wheat over with a shovel, after which

it should be bagged. He had sown it three days after, and as far as he knew there was no injury to the seed. He thought that 30lbs. of wheat was quite enough to sow to the acre. Where 1bush. was sown it would be far too thick, as it would check the growth of the plants and would not produce such a good sample as sown about 30lbs. to the acre. The Chairman, when reaping his seed, always left it till last, as it got properly ripe and there was no green grains left in it. He found that unless well-cleaned it was bad for sowing. He had made a practice of putting all his seed wheat over a drake screen, and in one instance he got about 28lbs. of small grain and dirt in about 9bush. of wheat. The way he pickled his wheat was as follows:—Take about 9bush. of wheat and put it on a floor, using 1lb. of bluestone in 3galls. of water and sprinkle it on the seed; then turn over three times with a shovel and let it stand over till morning. He considered 30lbs. was quite enough to sow in this district, for where from 40lbs. to 60lbs. were sown to the acre the grain would be smaller than where sown about 30lbs. to the acre. After a discussion on the subject, members of this Branch thought that about 30lbs. of wheat was quite sufficient for sowing in this district.

Dawson, May 13.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. Meyers (chair), Quinn, J., W. A., and J. A. Wilson, Smart, and Nottle (Hon. Sec.).

BULLOCKS ON THE FARM.—Mr. E. W. Smart said he had had a team of bullocks on his farm for a number of years, and found that they were hard to beat. He used his team for fallowing, cultivating, and harrowing, and they did their work as well as horses. If a farmer had a small holding he preferred to have a team of horses; but where a farmer had a large holding he would have a team of bullocks as well as a team of horses. For farm work he preferred to have them four abreast, as they were kept closer to their work; but for tank-sinking and on the roads he thought the ordinary way better. He had used his team of bullocks for ploughing in rabbit burrows, and found they did a lot better work than what horses will do. After a lengthy discussion the members of this Branch came to the conclusion a farmer having a large holding would find a team of good bullocks very handy.

Morchard, May 13.

(Average annual rainfall, 1½in.)

PRESENT.—Messrs. Kitto (chair), W. and H. Loop, Scriven, Munro, McCallum, Jasper, Kirkland, Loftes, Kupke, and McDougall (Hon. Sec.).

THE FARM HOMESTEAD.—The following paper on this subject was read by Mr. Kirkland:—"A farm homestead should not only be a place of habitation, as some people seem to make it, but it should also be a place of comfort to the farmer and his family, and also comfort and shelter to his animals. In order to secure this, some little time and energy must be expended. There should be a few acres of ground well fenced to keep out sheep and cattle, as if these are allowed to run around the house the place will never be tidy. A garden should be fenced off with wire netting to keep out fowls and hares, and a few flowers, shrubs, and vegetables could be grown. The other part of the reserved ground could be planted with a few trees each year, these trees being protected from fowls with wire netting and three or four stakes till they are 2ft. or 3ft. high. The implement sheds, a pigsty and yards, fowl-houses, &c., could be erected on this land, and Pepper trees could be planted as breakwinds. The stable and stockyards should be fenced off separately, and the cowyards and sheds should have a good fence around them. Wood or iron gates should be used instead of barbed wire or rails. Barbed wire gates are often left half open for animals to get through, and they get their legs caught and torn about. Small plots should also be fenced off near the stables and cowyards in which to plant a few trees, or to sow for green feed. The manure from the stables and yards can be put on them." Good discussion followed. Members agreed with the writer in practically everything touched upon in the paper.

Quorn, May 13.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. Thompson (chair), Cook, Schulze, Brewster, and Patten (Hon. Sec.).
WHAT IS A PROFITABLE MILK RECORD?—The Chairman read a paper from the *Livestock*

Journal under this title. The paper showed that no given yield of milk could be stated as "profitable" or otherwise for all herds. A certain quantity of milk per cow was needed to pay for the average cost of the keep of the cow, and all above this was profit. The implication was that dairymen should keep careful records of the cost of keeping and working the herd, calculate the average per cow, and cull out all those that did not give sufficient milk to show a profit on the cost of maintenance, &c. In the discussion which followed members agreed that it was bad business to keep a lot of poor milkers.

EXHIBITS.—Mr. Cook tabled some fine quinces and large cabbages grown by him at Quorn. The cabbages he planted 9in. apart, with 18in. between the rows. As they grew he cut each alternate one for the table, and thus allowed plenty of room for those remaining to heart and develop well.

WEEDS IN SEED OATS.—Mr. Schulze displayed 1½lbs. of drake, mustard, and other seeds taken from 2bush. of oats which he had procured from the South for seed purposes.

Wirrabara, April 15.

(Average annual rainfall, 30in.)

PRESNT.—Messrs. H. Woodlands (chair), Lawson, Curnow, Pitman, Hoskin, Thiselton, Stevens, Borgas, Bowman, A. Woodlands, Hollitt, Hendrick (Acting Sec.), and one visitor.

ONION-GROWING.—A paper on "Onion-growing" was read by Mr. Woodlands. While almost any soil would grow this crop, he said, the best class of soil was somewhat sandy, with a good clay subsoil. If poor the soil could be much improved by judicious manuring. Stable manure was good, but sheep manure was better, and when added to super. the result was a very fertile soil. If no other manure was available, it paid to apply the super. alone. The Brown Spanish was, in his opinion, the best variety of onion to grow. It was the heaviest cropper, the best quality, a good keeper, and as early as most other varieties. It was best to grow one's own seed by selecting the best onions every season, giving due consideration to size, shape, smallness of top, and general all round quality. The paper continued:—"When these onions are carefully selected they should be stored in a dry, cool, open place until about April or May, when they should be planted out. They will then produce seed for sowing the following season. The little trouble taken in growing one's own seed is well repaid in the quality and quantity of the crop, especially the quality. Of course a beginner must secure his seed from a reliable seedman. Then sow your seed. Great care must be taken in this. All your other efforts may be lost if this part is not properly done. First secure a nice piece of very light, if possible, slightly sandy soil; work this up into a bed and rake very level. If it is not perfectly level the water will run into the hollows, drowning the onions there, while those on the bumps will suffer from lack of water, and be of little or no use at planting time. After sowing the seed evenly, cover thinly with very light soil and mulch with sifted horse manure, decayed sawdust, or other fine litter. Then, if the weather is hot, water three times a day until the young plants are above ground, when once a day will do; later on once in two days, increasing the quantity as the plants grow. They will be ready for transplanting by about June. While they are growing the soil must be prepared for their reception. It should be manured if animal manure is to be used; then ploughed and harrowed as soon as it is wet enough. If commercial fertilisers are used, these need not be put on until the onions are ready to be planted out, when it should be sprinkled along the rows and raked in. When the onions are ready to be transplanted the ground must be ploughed again, ploughing a furrow, then raking and planting a row of onions. The rows may be 10in. or 12in. apart. If your soil is deep, plough deeply. I have seen some of the heaviest crops of onions grown on a deep black soil that was dug 10in. or 12in. deep. On the other hand, if the season is favorable, good crops may be obtained from comparatively shallow work. We had one of our heaviest crops last season from land ploughed 6in. or 7in. deep; but, taking the average season, shallow work will not pay as well as deep. However, the depth of ploughing must be regulated by the nature of the soil. Where the soil is shallow, or poor underneath, shallow work must be resorted to, and very heavy crops cannot be expected. The ground should be raked very fine and level on the surface, as this will give the young plants a fair chance and greatly facilitate after-cultivation. This can most profitably be done with a wheel-hoe, and this implement requires level ground. This machine between the rows, with the ordinary hand hoe between the plants in the rows, should be kept going from the time the first

weeds appear, or, if no weeds appear, from the time a crust first forms on the soil, until the plants are too big to admit of any further working of the soil. All that can now be done until the crop is ripe is to remove the seed stems as they appear. When the onions are ripe, which will be as soon as they are fully grown, or when the tops of the earlier ones are dry, they may be dug with the wheel-hoe before mentioned if the ground is fairly soft. If it is very hard the spade must be used. In good ground the spade is nowhere beside the wheel-hoe, in either speed or efficiency. Having dug the onions they must now be stored in such a way as to protect them from the weather. A very good way is to stack them in a long narrow heap, with the onions in the middle and the tops exposed to the weather, and covered on top with straw or other suitable covering that will keep out the rain." A good general discussion followed, and in reply to questions Mr. Woodlands said the best time to plant onions was at the beginning of March. Stable manure, if used, should be applied about 3in. deep and be well worked in.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Georgetown, May 18.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. W. Hill (chair), McAuley, Fogarty, P. T. and G. Hill, Thomson, Freebairn, McDonald, and Eyre (Hon. Sec.).

(GRADING SEED WHEAT.—Mr. W. Thomson read a paper to the following effect :— " A great deal has been said about selection of seed wheat by hand, and while this method is proving to be an advantage in small plots, for large areas they wanted a machine that would clean the wheat thoroughly. The seed grader will do this work, and give a uniform sample that will run through the drill without any trouble, and thus produce a more even crop. The grader can be adjusted to clean almost any sample of wheat. A good sample can be run through without any big grains being wasted. The straw and bits of heads will go over the rear of the machine, and the screenings are in two lots, one of which is practically useless, and the other may be sold as good feed for fowls. Taking a poorer sample of wheat, it is wonderful to see how well it can be cleaned with a little care. Some farmers object to the grader because it is slow, but two men can put 50 bags of wheat through in a day, and if done well it is worth the trouble. Very often after about two days' cleaning seed wheat with the winnower you have a day's work to clean up the screenings and spoutings and try to make a marketable sample of them, but with the grader you can sow them all as you go. A good number of farmers who have used the grader, as well as those who have not, are wondering whether it pays to grade seed wheat, but the removal of broken grain and foreign matter is more satisfactorily done with the grader than with any other machine. The broken grain is wasted when sown with the good, and most agricultural land gets weeds enough without sowing any more, and a few years will prove that it is a distinct advantage to grade seed wheat." Most of the members were of opinion that grading the seed wheat was a desirable and profitable practice, but Mr. Freebairn said that after several years' experience with a grader he was not convinced of its advantages.

Mount Bryan East, May 13.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. J. Thomas (chair), Gare, Doyle, Dunstan, F. and R. Thomas, Quinn (Hon. Sec.), and two visitors.

FARM WATER SUPPLY.—Mr. R. Thomas read a paper under this heading. There was considerable uncertainty, he said, in well-sinking as to whether fresh water, if any at all, would be struck. Raising well water to tanks and troughs necessitated pumps

and the use of wind or other power. On a large property the cost of working a number of wells was considerable. He preferred to make dams in every paddock used for stock. A site with a good holding soil should be chosen for the dam. The suitability of the soil could be judged by working up a little with water. If retentive and sticky it was suitable; but if free and ashy the reverse was the case. A trial hole should then be put down to test the depth and quality of the soil. The catchment had to be considered carefully. Bare clay would run a lot more water into the dam than would grassy limestone soil of the same area. It was better to have a dam on the large side than too small; and unless other permanent water was available, some of the dams should be large enough to hold water for 12 months. The paper then continued as follows:—"Depth is more to be considered in a dam than area; but, of course, it takes area to get depth. A dam one is depending on should be from 12ft. to 15ft. deep to be reliable. This means that the top measurements should be 30yds. or 35yds. wide and 40yds. to 50yds. long. In drier country than this they need to be larger, in proportion to the length of dry spells to be expected and the number of sheep or cattle kept. A dam seldom holds well the first few times water is run into it. To remedy this sheep should be put to water at it immediately after it is filled. With good drainage it is often possible to get double as much water off a given area as could be secured in its original state. Do not make the drain with too steep a gradient or it will be likely to wash out and form a creek, unless in stony ground; 6in. or 9in. to the chain is a sufficient fall. It is necessary to use a spirit level or something similar when marking out a drain. We have made several miles of drains on our country with bullocks. We plough from 6 to 12 furrows wide, according to the quantity of water to be carried, and 8in. or 9in. deep, and scoop it out on the lower side with a buckscraper and bank it up so that it will carry more water. In front of every dam a catchpit should be sunk to catch silt from drains, &c. By this means much less silt gets into the dam. When the catchpit is full of silt it can easily be cleaned out without interfering with the dam. A silt scoop is the best appliance for cleaning out a dam, because it can be done while the water is in. The original depth can, therefore, be maintained without letting it go dry. With one $\frac{3}{4}$ yd. silt scoop and 10 or 12 bullocks, 80yds. per day can be taken out easily. All the water should be guided so that it enters the dam at one corner only. When the inlet starts to wash it is necessary to prevent it from going further. We have tried brush inlets and found them a success. We use young mallee and lay it in fish-scale fashion, commencing at the bottom, and lay leaves downwards and tie down by putting wires across to small posts."

SEARING-IRON v. KNIFE.—Some discussion took place in regard to tailing lambs. The Chairman had discarded the searing-iron in favor of the knife on account of losses through lockjaw and the longer time required for the wound to heal when the iron was used. On a vote being taken, all those present declared themselves in favor of the knife for this purpose.

Mount Bryan, May 15.

(Average annual rainfall, 15 $\frac{1}{2}$ in.)

PRESENT.—MRS. Hatherly (chair), Wardle, Schmidt, Thomas, Trallagan, Collins, and Hatherly (Hon. Sec.).

PICKLING SEED WHEAT.—Some discussion on this subject took place. Mr. Wardle preferred to use the bluestone pickle if sowing in dry soil, but thought "Fungusine" was better if sowing after rain. Other members had not had experience with the last-named pickle, and therefore were unable to express their opinion.

Whyte-Yarcowie, May 13.

(Average annual rainfall, 13 $\frac{1}{2}$ in.)

PRESENT.—MRS. Lock (chair), J. and W. Hunt, McCann, Mitchell, Mudge, Wittwer, Robinson, and Pearce (Acting Hon. Sec.).

BUREAU WORK.—Mr. Lock read the following paper on "How Can We Enlarge the Scope of Bureau Work?"—"The Agricultural Bureau is a fine institution, by which much useful information is circulated amongst the farmers. It creates a healthy rivalry between local men, and the gathering together and exchange of ideas creates a thirst for greater knowledge. Most of our farmers realise to a certain extent at least the price

which must be paid to be a successful farmer in these days, but that is not enough. We must see as far into the future as we can, and do all we possibly can to increase the returns from the soil, for there is every prospect of the cost of production becoming greater. The Agricultural Bureau so far has achieved good results, and our Branch has a splendid record, but there is room for greater usefulness. One thing necessary is to enlarge its scope by getting more interested in it. There are still a number of farmers around this district not connected with our Branch, and others who, although they are nominally members, do not seem to realise that it is possible that they might spend an hour or two at our meetings more profitably than even working on their farms. The problem is how can we enlarge the scope and usefulness of our Bureau in general, and how get the younger and rising generation of farmers interested? Some of our older members can well afford to say, "Present-day methods are good enough for me," but the rising generation if content with things as they are will in time to come—and not such a long time either—find themselves left, and success rewarding others in their place. In the first place I would suggest having a social evening, or something similar, and at that time make a special appeal, and bring before them the objects of the Bureau; show the need for education, and the pecuniary advantages which may be gained by meeting together and talking over ways and means. Then if the meetings were held in the evening it would probably suit a greater number, for a farmer has not much spare time, and often a job crops up in the afternoon which must receive attention, and with some it is hard to persuade them that it might be more profitable to spend an hour or two talking over their business than to plough an acre or so. In some cases possibly the father does not see the need of such things, and does not encourage his sons to spend their time thus. Another way which would possibly succeed is a personal canvass, i.e., our members might at any convenient time remember the claims of the Bureau, and impress it on others who do not belong to it; get them to attend the meetings—not necessarily to join—for unless they are likely to become active, enthusiastic members their names are better not added to an already longer list than the attendance warrants. It is the young fellows around that we particularly want to get interested, not because the older men are getting stale, but mainly because it is the younger generation who will have to go in for the work on more scientific lines, and the exchange of ideas and thoughts will spur them on to acquire more knowledge. How can we further the usefulness of the Bureau? By arranging for a useful discussion at each meeting, choosing only such subjects as will be likely to provide such, and appointing members to write up the subject who are likely to be conversant with it, and who will loyally do their best without fail. Encourage the younger members to take part in the discussions, and, if possible, get them to write papers. If possible organise a system of experimental work to be carried out by the members. At present most of us do something in the way of experimenting, but in a haphazard sort of way. Let us have a system; have if possible a small experimental plot on each farm—one member to test the value and suitability of manures, another deep and shallow ploughing, a third to test different varieties of new wheat, and so on, and each to report results to meeting. By this organised action, and with the expenditure of a little time (for, of course, the plots must not be large or the variety of experiments for one member many, as time is always valuable on a farm), we would popularise the Bureau, make our meetings more interesting and instructive, stimulate the desire for further progress, and the whole of the members would gain much useful information, which, if obtained by each individual separately, would take much longer time and more labor. Then, at some convenient time during the year set aside a day, declare it the farmers' holiday, make a picnic of it, and go around and inspect the different experimental plots; and if this is done no doubt the different members will see to it that the visitors, as far as they can arrange it, will have something to look at. The Governments, past and present, have done much to further the producing interests of this State, and the money spent that way has been returned indirectly many times over, but there is much more to be done before they do what is being done in some other countries. The United States of America spend a great amount of money in educating the primary producer, and one thing which appeals to me as particularly good is the fitting up of a train with various exhibits and travel it around with various experts on board to lecture to and generally educate the farming community, who, it is said, flock to hear and see the different exhibits. Such a thing may not be possible in this State, but I cannot see why it is not; but if such were done I am positive it would soon prove to be a good investment on the Government's part, and would incidentally do much to popularise the Bureau." [We would specially commend this paper to the notice of Bureau members. The Branches of the Bureau can be of great value to their respective districts; it rests entirely with the members whether they are so.—Ed.]

Yongala Vale, May 6.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lloyd (chair), Battersby, J. and P. Chigwidden, Edson, C. and E. Fowler, Jamieson, Keatley, Schmidt (Hon. Sec.), and two visitors.

LUCERNE-GROWING.—Mr. C. Fowler read a paper on the "Cultivation of Lucerne." He considered that a great deal more of this fodder could be cultivated in this district with advantage. The climatic and soil conditions were favorable to its production. He recommended American, Turkestan, and Hunter River varieties. The Turkestan was said to germinate more quickly than others, and the quality of the fodder was superior. Lucerne would thrive in almost any soil except where there was too much moisture (badly drained) or too much acid in the soil. Where this latter trouble was experienced heavy coats of lime would considerably improve matters. The bed for lucerne should be carefully prepared and worked thoroughly several months before sowing. In this district he would sow in the month of August. The danger from frost was not then so great, and the plants were able to obtain a good hold before the dry weather set in. In good soil which could be irrigated, 20 lbs. of seed per acre was not too much to sow; but where irrigation was not practicable, 12 lbs. to 15 lbs. per acre was sufficient. The cutting of the crop should be commenced when 10 per cent. of the field was in bloom, and completed by the time half of it was in bloom. The leaves and stems were then of most value as food. Once established, lucerne would last for many years, but periodical cultivation was necessary to get the best results.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Blyth, May 16.

PRESENT.—Messrs. A. L. McEwin (chair), Dunstone, Zweek, Longmire, Williams, Schuster, Schulze, Roberts, Coleman, Buzacott, Gell, Shepherd, Lehmann, McEwin, H. W. and W. O. Eime (Hon. Sec.), and two visitors.

CARE OF HARNESS.—Mr. C. Lehmann read the following paper:—"Harness is an expensive item, and calls for careful treatment. Saddles thrown on their backs, or left in the hot sun or in the rain will not last long; whereas, if they are carefully hung up secure from the weather they will last for many years. They need to be dressed with some preparation from time to time. Collars, wipers, traces, cart saddles, breechings, &c., are usually knocked out—not worn out. It would be well for the farmer to thoroughly overhaul his harness two or three times a year, and have any breakages attended to at once, either by himself or a saddler. It is also a good plan to make a note of anything which will soon need to be replaced. In my opinion brown harness is more durable than black. The former leather was in its natural state, except for tanning, while the black had been subjected to certain chemicals in dyeing it, which removed much of the natural grease and left the leather hard and dry. Oil could be applied, but did not fully restore the flexibility and wear-resisting qualities. To clean black buggy harness it should be taken to pieces and washed with warm water and soft soap, using a brush and plenty of 'elbow grease.' Hang the harness up to let the water drain off (not in the sun), and when dry apply on the inside of the various straps and parts a thin coating of neatsfoot oil. On the outside use some prepared harness-dressing. Apply lightly with a sponge and a brilliant and glossy appearance will result. For a brown set the same method will apply, excepting for the outside dressing, for which I use Harris's harness composition. For spring cart, dray, or wagon harness refined neatsfoot oil is the most useful preservative you can find. In all cases the harness must be well washed and dried before the oil or dressing is applied. On no account allow the oil to remain on the surface of the leather or it will pick up the dust and make a thick greasy coating on the outside of the harness. Just put on sufficient to penetrate. Regarding the most important part of all, the farm horse's collar, in purchasing a new one, if the horse is in good working order, have it just

a trifle tight, and let him work in it. He will soon pull that collar into the shape required to fit him and will work in comfort. About six months after purchasing have the collar lined and stuffed, and it should be all that is necessary for your horse. If possible have a separate collar for each horse, and do not allow 'Bonnie' to work in 'Trooper's' collar. When drilling I use rings in the bottom of the hames. By using these rings a short strap is all you want, and you save pounds by so doing, as the pole straps soon cut a collar in two by strapping round the collar. On no account put too much oil on the collar; it is not required, and the oil penetrates to the straw, and when they are lined and stuffed they will not give satisfaction. When not in use place collars in the shade, especially when wet. Do not let the sun play on them, for it will draw on the straw and alter the shape. Have all collars lined with check for farm work, as it is cheaper and cooler than leather lining, which looks very nice and can be easily kept clean, but it gets very hot and is likely to scald when the horse sweats. If you prefer leather lining, wipe it with a damp rag occasionally, but do not put any oil on it or it will penetrate to the hair and take all the spring away. Sore shoulders are in most cases due to the fault of the driver. These bad sores do not occur in one day. It takes some rubbing to rub the skin off, which should be noticed when removing or placing the collar on the horse. Why not then attend to it? Give the collar a good bottling and ease the place on the collar where it hurts the horse. See if the draught of the hames is on the right place to suit the animal; also see if the chains are exactly the same length. Look for any other little part that may be misplaced; see to it at once and you will get better results from your horses and a lot more pleasure in driving them." During the discussion the question arose as to whether a collar lined with check or with leather was better for buggy work. Several thought that leather would be cooler, but check would be best if the horse had a sore. Mr. McEwin said he thought that the oil was too sharp for harness; he found mutton fat was the best. Mr. Coleman said he used nothing but neatsfoot oil, as it penetrated the harness better than the fat, and it was least trouble putting on. Mr. Lehmann found a good mixture in the following:—Two parts mutton fat, one part neatsfoot oil, and one part resin. Mr. Eime found half beef fat and half neatsfoot oil very good. The majority thought harness should be cleaned at least twice a year.

Clare, April 21.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. McKenzie (chair), Bowman, Lockyer, Walker, Radford, Maynard, Keane, Pink, Hill, Jarman, Menzie, Lee, Johnson, Kollosche, Kelly, Scales, Knappstein (Hon. Sec.), and one visitor.

ROSEWORTHY AGRICULTURAL COLLEGE.—Mr. Menzie outlined the work done by students at the Roseworthy Agricultural College, and urged farmers to send their sons to take the three-year course. Messrs. Jarman and Knappstein, both former scholars of this institution, spoke in the highest terms of the value of this thorough education to the man on the land. It was nonsense, they said, for farmers to imagine that their sons could learn as much on a well-managed farm as at the college. Such practical subjects as chemistry and veterinary science could not be mastered without such a course of study.

Clare, May 8.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. McKenzie (chair), Mayor, Tuohy, Dux, Jarman, Johnson, Keane, Kelly, Pink, Kollosche, Victorsen, Menzie, J. H. and P. H. Knappstein (Hon. Sec.).

BUREAU WORK.—The following paper on "Suggestions for the Improvement of the Agricultural Bureau" was read by Mr. P. H. Knappstein:—"In writing this paper it is with the object of improving our Bureau, as I have noticed during the two years I have been your secretary that our attendance of members is not what it should be. I have come to the conclusion that to get a good average attendance we must try to make our meetings a little more interesting to all members; that is to say, not to only have one paper read at each meeting as in the past, but to ask, say, two

different members to bring up something for discussion. Then, again, I think it would be a good plan if we were to have a question box, as other Branches have, and for this box to be placed at some public place where other producers besides members of this Branch could place written questions; this box to be opened at every meeting, and the questions asked to be answered by our members if possible, if not, for them to be forwarded on to the expert under whose department the question comes for him to answer it. Answering questions will always lead to good discussions, which bring out points which are very educational to everyone concerned. Then I think our homestead meetings are neglected. My idea is to ask which members would be willing to invite us out as a Bureau to inspect their farms or gardens, as there are always a lot of good points to be picked up at meetings of this sort, no matter how large or small a place may be, and most likely we would be able to point out some improvements to our host. It is more than likely that we would see something that would lead us to improve our places as well. I think we should hold these meetings every three months, and for them not to interfere in any way with the ordinary meetings. Also, I think it would be a good plan for us to ask permission to hold a conference of Lower North Branches, that is from Adelaide to Farrell's Flat, in Clare. I would suggest this conference to be held in September or October, but ask the experts of the different departments to read papers to us, and then have a free parliament for all members and delegates from other Branches to bring up anything for discussion. In regard to having a member read a paper at each of our meetings, I suggest that the secretary make up a list of members, every one having a different calling so as to vary the subjects, and to start alphabetically as much as possible, and for those members to read a paper at whatever month's meeting their turn comes on. At our annual meeting next month I think that those members (excepting new members of this last year) who have not attended three meetings for the year should be struck off the roll, unless they give a good reason for not attending more regularly, as we have a lot of names on our roll of members who take little or no interest in our meetings. It is very disheartening to be continually writing notices to them, and find then that they do not attend." A good discussion followed, in which the Hon. Secretary was commended for his able suggestions. Mr. J. H. Knappstein thought that homestead meetings were a good idea, and should be held more often, and was supported by Mr. Victorson. Mr. Menzie agreed with all points of the paper, and agreed that meetings should be made more interesting, and that each member should help make a discussion on different subjects. He also said that the question box should be reinstated. Mr. Kollosche thought the paper covered a lot of good points, but considered the Hon. Secretary sounded a doleful note in regard to attendance, as he thought it was fair, all things taken into consideration. In regard to members reading a paper, he thought the difficulty could be overcome a little if the secretary was to write out a list of subjects individual members could choose from to write a paper on. Members did not think that it was possible to hold a successful conference in Clare, as we were too far away from the railway for delegates of other Branches to attend. During the discussion Messrs J. H. Knappstein and Victorson respectively invited members of the Bureau out to their gardens some time in spring for homestead meetings. It was decided to place the question box in Mr. Pink's office, and producers are invited to put any written questions they would like answered with reference to agriculture in it.

Gawler River, May 12.

(Average annual rainfall, 18in.)

PRESENT.—MRSRS. J. H. Dawkins (chair), Davis, Leak, Winckel, C. A. Dawkins, Richter, Hillier, Bray (Hon. Sec.), and five visitors.

FARM LABOR.—The problem of farm labor was introduced for discussion by Mr. Winckel. He considered that it was time for farmers to unite and draw up a scale of wages to be paid to farm laborers. Members agreed that the present state of affairs was unsatisfactory, as men were tempted from one position to another by higher wages, and sometimes left their employers at a very awkward time. All agreed that there was a limit to the amount which could be paid in labor and still have the farm profitably worked, and it was thought that it might become necessary for farmers to assist each other at harvest time, owing to shortage of labor and the demand for extortionate wages. It would be better, it was

considered, to crop smaller areas and keep more sheep than to extend the cereal-growing operations, which demanded the employment of so much labor. Members considered it quite impracticable to carry on farm operations satisfactorily under any arrangement of fixed hours for work.

Saddleworth, April 28.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. Cornwell (chair), Frost, Eckermann, Crawford, Colebatch, Graham-Coleman (Hon. Sec.), and one visitor.

HORSE COMPLAINTS.—Mr. Colebatch read an interesting paper dealing with the symptoms and treatment of spasmodic colic, inflammation of the bowels, and worms in horses.

Salisbury, May 2.

PRESENT.—Messrs. Moss (chair), King, Coker, J., E. V., and A. H. Harvey, McNichol, Bagster, Allington, Tate, Goodall, Frost, Bussenschutt, Sexton, Short, James, Shepherdson, Powell, L. and A. G. Jenkins, (Hon. Sec.) and three visitors.

SHEEP-FARMING.—Mr. Neal delivered an address on sheep-farming in the Lower North. He went in principally for breeding freezers, and favored the Lincoln-Merino crossbreds with Shropshires for lambs. His crossbred wool brought him a better price than the pure Merino. Merino ewes lambed better to Lincoln rams than to Shropshires, especially two toothed. He found the following a safe rule for estimating the dressed weight of crossbred lambs, viz.:—"To half the live weight add 4lbs." He found it absolutely necessary to dip the sheep, and it was a practice that paid well. The first year he dipped, only half the flock was so treated, and the wool from these realised 1½d. per pound more than that which had not been dipped. Dipping made the wool brighter and better, and the process protected ewes from flies to an extent. Two men could dip 600 sheep in a day, at a cost of about 8s. per 100. He preferred concrete dips to those of iron.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Maitland, May 6.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. Opie (chair), Bawden, Barry, Heilemann, Hill, Tossell, and Pitcher (Hon. Sec.).

BUREAU WORK AND EFFECTIVENESS.—Some discussion took place regarding the lack of interest in Bureau work. Mr. Tossell considered that in this branch more work and a general "stir up" was needed. Mr. Hill thought considerable interest could be aroused if homestead meetings were arranged. Mr. Opie commented upon the general but erroneous opinion that the meetings were not open to the general public.

FALLOW.—In reply to a question, Mr. Tossell said he would not plough stubble land or fallow while dry, but would wait till after the winter rains had fallen and then plough in early spring. Mr. Hill said that land broken up before the winter would not set so hard in the spring. He considered it best to plough directly after harvest.

LUCERNE-GROWING.—It was stated that land for lucerne should be worked well and fine. The seed should be put in with the best machine available, and should be sown in March. Mr. Tossell spoke of the practice of sowing some lucerne in the wheat to provide feed in the stubble.

SHEEP FOR DISTRICT.—Members agreed that for farmers the Merino sheep were best. They produced the most profitable fleeces, made excellent mutton, and were easily kept between fences.

WESTERN DISTRICT.

Koppio, May 11.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Brennand (chair), G. and M. Howard, Thompson, Jericho, Richardson (Hon. Sec.), and two visitors.

SOME NOTES ON CROPPING.—Mr. R. Richardson read a paper to the following effect :—
 “Of course, the previous working fallow land has had will make a difference to the working at seeding time. If the land has been well worked up during the spring and autumn all that is required is a light cultivator ahead of the drill to stir up the soil, kill any grass that has escaped previous working, and make a good seed bed. If the land has not been worked previously it will require a thoroughly good string up. With our land there is little difficulty in making a good seed bed, provided the land is in good working order. With fallow I prefer to work it down after the summer and autumn rains, and then run a light cultivator ahead of the drill. Land that is ploughed in the autumn or during seeding is very often not in a fit condition to be drilled without some further working than simply drilling after the plough. If it is stubble land, and in good condition, the plough will make a fairly good seed bed, but more often the ground is left too rough. I should recommend ploughing as much as possible before starting seeding, and then run a light cultivator ahead of the drill. I should even prefer to plough stubble land dry where a fairly good job can be made, and then give it a good cultivating ahead of the drill after a good rain has fallen, than to simply plough and drill it. New ground is very difficult to get into a fit condition to sow, and I should fallow it where possible. In all cases we should aim at getting a good seed bed before starting to sow the seed. Always be sure you are sowing the best and cleanest seed you can obtain. Sow dirty seed and the result will be a dirty and inferior sample for sale the following year, besides spreading a lot of undesirable weeds over the land. I strongly recommend every farmer to grade his seed wheat. Let him do it once or twice and he will always do it. The grader not only removes foreign weeds, but takes out a lot of pinched and small stuff that would otherwise be sown, taking the place of good seed and giving a small, inferior plant. Another thing farmers should pay more attention to is the selection of seed. By selecting seed he can always have a pure sample, and will increase the yield per acre. The quantity of seed to sow will vary according to the variety. For a late wheat that stools well I think a bushel per acre a fair thing. The early varieties will require more—not less than 75lbs. to 80lbs; for oats about 50lbs., and barley a bushel per acre. A hay crop requires to be sown thicker, and it will pay to either broadcast some of the seed or else cross-drill it. The seed should be carefully pickled, to kill any fungus germs present. For wheat we have had good results by using a 5 per cent. solution of bluestone. [This is very strong; a 1 per cent. to 2 per cent. solution will kill the smut.—Ed.] Oats and barley require stronger pickle, on account of the outside shell. I think a 10 per cent. solution will be found effective. Fungus and formalin are well spoken of by those who have used them, and they do not destroy so much seed as bluestone. There are a great many different kinds of manure sold, but the most universally used and the most suitable for cereal crops in South Australia is the water-soluble phosphate. After experimenting for several years with water-soluble, citrate-soluble, and insoluble phosphates we found that the former was far and away the most economical form in which to use phosphates. I should recommend a good dressing, not less than 1cwt. per acre, increasing this if it can be done. Although at one time farmers were inclined to think the continued use of phosphates would impoverish the soil, with a heavy rainfall like ours there need be no fear of overdoing it, and I feel sure it would pay everyone to use 2cwt. per acre. There may not be a very big increase in the crop, but the land would be left much richer and give far more feed, so that we would get the benefit of the extra dressing indirectly by being able to carry more stock.” A lengthy discussion followed, members agreeing in general with the writer. One member stated that he had found dry ploughing conducive to takeall, but he had not worked the land after rain with a cultivator as suggested by Mr. Richardson. Most members favored pickling with bluestone. Mr. Howard had used formalin, but germination was bad.

Miltalie, May 18.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Jacobs (chair), J. P., I. W., G. W., and E. Story, Ramsey, Wilson, Kobelt, Sutton, Alm, Hier, (Hon. Sec.) and three visitors.

FARMING.—Mr. E. Story read a paper dealing with general farm work. Land for wheat, he said, should be fallowed and well worked. It needed more than just enough working to kill the weeds. The paper then continued as follows:—"If you can get to work on the weeds while they are small they are killed all the more easily. If you start just after the rain you will kill the first crop, but they will come up behind you all the time, and if you stop to drill the seed in as you plough, the first crop on what you have not ploughed will grow too big to kill, and if it is wet weather you cannot deal with them at all. Dandelions are especially troublesome. To work his land thoroughly a farmer must have plenty of horses: these have to be well looked after to enable them to undertake the work of going over the ground so many times. They should have a good warm stable for cold winter nights. This should be kept clean and not left to get stuffy or close. The horses should be fed regularly and well-groomed once a day at least. Implements should also receive more care than they do on most farms. If the farmer is always buying new implements he will require to grow more than a 20bush. crop. This is where a good deal of the farmer's money goes. He has enough implements to work his farm, but when he sees one of his neighbors with some new machine he thinks it is a great success, and orders one on the spot. If it turns out a failure he sells it to someone else at a third of the value of a first-class machine." Considerable discussion followed. Mr. Kobelt said that weeds were most easily got rid of by working the land in dry weather and just as the weeds were springing up after rain. Mr. J. P. Story advocated dealing with dandelions three or four days after rain. In reply to a question Mr. E. Story said he was in favor of having iron stables, with a stall for each horse. Some speakers thought two horses could be in one stall, while others had no trouble with up to 24 animals in one "crib." Most members thought it better to have one room for harness than to keep each horse's harness in his stall.

Shannon, May 13.

PRESENT.—Messrs. Proctor (chair), Cronin, Wilkins, H. Proctor, Gordon, Davie, Smith, Dollard, J., M., and J. J. Cronin (Hon. Sec.).

HOW TO LAY OUT A FARM.—The following paper on this subject was read by Mr. Smith:—"In planning permanent improvements on an undulating scrub block of from 1,500 acres to 2,000 acres, the first thing to consider is the position of the homestead. Much of the comfort and ultimate success of the mixed farmer depends on the care taken in the selection of this site. A spot should be chosen on a sandy rise, close to a creek or other place suitable for a dam—a well is even better if this is practicable. It should be in as central a position as possible. The arrangement of the paddocks comes next in importance. The advantages of combining sheep-farming with cereal-growing, and the necessity here for fallowing make the three-year rotation of crop, pasture, and fallow about the most practicable system of working the large areas necessary in scrub farming. The block should, therefore, be divided with a substantial sheep and cattle proof fence into three main paddocks, all adjoining the homestead. Nearly every scrub block is surveyed with at least one of its boundaries running north and south or east and west. This straight line should be taken as a base, and all division fences should run parallel with or at right angles to it, thus making rectangular paddocks wherever possible. This, besides facilitating farming operations in general, will simplify further subdivision if it should become necessary. Personally, I think the larger paddocks are the more suitable, for a year or two at any rate, because, although it has been proved that subdivision into small paddocks increases the stock-carrying capacity of land, there are certain disadvantages attending the system. For instance, water must be provided in all paddocks not adjacent to the homestead, and small paddocks mean a lot of useless travelling to and from work. A small block of about 10 chains square should be fenced in the corner of one of the larger paddocks for the homestead. A piece of scrub should be left standing here for shelter. Laying out the homestead depends so much on local conditions that it is impossible to give more than a few general suggestions which must be modified by circumstances. This block should include house and garden, greenfeed paddock, dam, and all farm buildings. A fowl-proof fence should be erected between the garden and farm yard. The stable should be placed on a well-drained spot, and the horse yard so arranged that water may be provided in it easily by means of a pump. Pipes can also

be laid to troughs in the paddocks at a small cost. The dam should be close to the stable yard, but so situated that the drainage from the stable does not run into it. I think it a good idea to have the stable and implement shed back to back, with the chaffhouse at the end joining the stack yard. This can be easily arranged and is very convenient. The stack should be securely fenced from fowls and stock. Although it is impossible to find an ideal homestead site on every block, much may be done towards making things convenient if everything is planned out roughly before important improvements are commenced." In the discussion which followed, Mr. Cronin agreed with the writer in regard to most points, but would not have the implement shed and stable in one, as there was a great danger of fire. Mr. Wilkins thought the arrangement of paddocks was excellent. The Hon. Secretary would have the stables built at right angles, half running east and west and half north and south, as in this way better shelter was provided.

QUANTITY OF WHEAT TO SOW.—A discussion on the right quantity of seed wheat to sow per acre was initiated by Mr. Wilkins. This, in the opinion of members, depended entirely on the class of ground; but 40lbs. or 45lbs. on stubble land and 50lbs. to 55lbs. on new land or fallow was thought to be usually sufficient.

Utera Plains, May 13.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Gale (chair), A. and C. Venning, R. H., and T. Hornhardt, Stephens. Hill, Bibney, Barber, Guidern, Naughton, J. and M. Abrook, Brannack, Ramsey (Hon. Sec.), and six visitors.

MANURES.—Mr. J. Naughton read an interesting paper on this subject. He dealt with the different classes of plant food, and the various manures which supplied the necessary ingredients. He referred to the fact that so far phosphatic manures had proved of most value in this State. While in districts with a rainfall of 20in. and over bonedust and other phosphatic manures of a less soluble nature than superphosphate had given good results, in the drier districts the latter was most satisfactory. With soil of a fair type he thought 50lbs. of super. per acre sufficient in a district with 12in. to 14in. of rain, but if the soil is poorer he would increase the amount to 70lbs. to 80lbs. For hay crops these figures might be increased with advantage. In purchasing super. the farmer should insist on its being dry, well ground, and free running. There were a large number of brands of super. on the market, and these seemed to give different results under different conditions. It was therefore necessary for farmers to carry out careful experiments to find out for themselves which suited their conditions best. Mr. Naughton quoted from report of Yongala Vale Branch results of experiments with different manures with different wheats and other cereals. Mr. A. Venning thought it unwise to use the same manure each season. Mr. Hill urged farmers to experiment for themselves. It was necessary to strip and weigh the crop from each plot separately, as however careful they might be they could not judge accurately by observation the returns. One member thought 40lbs. of super. per acre sufficient, while another stated that on the pine land in this district 20lbs. would be enough.

Yadnarie, May 18th.

PRESENT.—Messrs. Schubert (chair), J. A., T. C., C. J., and F. Dreckow, Weiss, F. W. and A. Jericho, Kruger, Spriggs, Mowat, Brown, R. B. and J. J. Deer (Hon. Sec.), and five visitors.

HOE v. DISC DRILL.—Mr. A. Spriggs read a paper to the following effect:—"I believe we should plough shallow and drill deep. The reason for drilling deep is that the root of the plant gains more moisture during any dry spells in the spring, when the moisture is mostly wanted to top off the crop. With shallow-drilled wheat some of the seed gets uncovered from the pelting of rain, and does not stand a dry spell so well. If you drill your seed not more than from 2in. to 2½in. you will find that when the plant does come up it will make better progress, and also finish up better than the shallow-drilled wheat. Another way deep drilling is favored is that the root, being deeper in the ground, gives the plant a far better chance to stand the rough winds. The next point is which drill is the best—the hoe or disc. I have proved the hoe drill to grow the best crop, and again it is as good as extra cultivating. The disc drill will not work up the soil when wet, as it clogs on the disc and prevents it from going in. Any small stick or rubbish will raise the disc out of the ground and leave the seed and phosphate on the surface uncovered,

Where a drill with hoes 8in. apart, set with a good zigzag, follows the plough you will find that the drill will pass through almost anything that the plough will. If the land is too dirty, horse-rake it and burn the rubbish, as the extra crop would pay for it. Paper was well discussed, members differing in their views as to the respective merits of the two classes of drills.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, May 12.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Hill (chair), Venning, F. and A. H. Fidge, Bone, Gibbs, Liersch, Gurner, Cavanagh, Wall (Hon. Sec.), and five visitors.

FARM NOTES.—Mr. Venning, speaking on some of the aspects of farm work, said that in this district ploughing should commence at about the beginning of April. He considered 150 acres enough for one man and a team to crop each year. Where takeall appeared it was undoubtedly wise to grow a crop or two of oats. Mr. Cavanagh thought it best to start seeding in May, and he was sure it paid farmers to experiment. [Experiments are especially of value if careful records are kept and, in the case of cereal-growing if the yields from the various plots are weighed separately.—ED.] Mr. Fidge agreed that 150 acres was enough for one man and a team to put under crop. He further considered it paid to have a man to work the team, leaving the owner to attend to general management and odd jobs.

WHEATS FOR DISTRICT.—Members agreed that Federation, Purple Straw, Marshall's No. 3, and Yandilla King were the best wheats for this district.

Forster, April 6.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. J. Searle (chair), Hayman, Luxon, G. H., and W. Searle, Payne, H. and E. Towill (Acting Sec.), and one visitor.

FALLOWING.—A paper on "The Fallow" was read by the Chairman. He contended that in this district every farmer should fallow some of his land each year. Early fallow could be worked better than late, and the weeds had a chance to grow and could be turned in to rot before the dry weather set in. If the soil was broken up early the rain had a chance to penetrate instead of running off, and by keeping the surface loose with the harrows a great deal of it could be retained and carried over to the following season for the use of the crop. The fallow should therefore be harrowed after every rain. Fallow must be kept clean and well worked if it was to give satisfactory returns. He also considered it far better to wait for a seasonable rain than to sow the seed when the soil was dry.

THE FARM WORKSHOP.—The following practical paper was read by Mr. Payne:—"A well-equipped workshop on the farm is a very great time and money saver. In many cases in the back country it takes longer to go to the local blacksmith with a small job than to do the work if a forge with a few handy tools is available. On a wet day, when it would be unpleasant working on the land, a farmer could do many little blacksmithing and carpentering jobs, and also mend harness and get things ready for good weather. The average farmer will soon learn to effect small repairs, and by doing so will get to know more about his implements and machinery than if he depends altogether on the local blacksmith. It is better to be able to make a bolt the right length and size than to use one that does not fit or, worse still, to use a piece of fence wire. A farmer in the back country will find it pays to do his own horse-shoeing. I have shod all my horses for more than 12 years. During this time I have thereby saved over £70, and most of this has been done in spare time. A farmer who pays for all his small work at high rates is burning the candle at both ends."

Geranium, May 13.

PRESENT.—Messrs. W. Mitchell (chair), Leahy, W. Mitchell, jun., Blatchford, Bowden, Dohnt, Pannell (Hon. Sec.), and nine visitors.

THE BEST SEEDING METHODS.—A paper on this subject was read by Mr. W. Mitchell jun. to the following effect:—"In considering the best method of seeding in this district, first of all is the preparation of the land for the drill. If newly-burnt ground (and a good burn) a cultivator is the best implement to go in front or behind the drill. I do not think it matters much if you drill your seed before cultivating or after. I like to see the cultivator well in the ground, and to work it in this way it takes six horses on a 13-tine cultivator. I have mostly used a skim plough, which does very good work in newly-burnt land. If it is stubble land that is to be put in, then there is no implement better than a disc cultivator, and to work a five twin disc takes seven horses. I do not think it is any good going too far ahead of the drill with a cultivator, for on some of the new ground if you get a good rain the land is set, and you cannot drill it. Some people favor harrowing, but if the cultivator and drill are working close together I do not think harrowing is any good, as in sand it buries the wheat too deep, but if the cultivator is a long way ahead of the drill and the land has had rain on it, then the firm ground wants harrowing; and some of the stony land around here also wants harrowing to cover all the seed. If the land has had a good burn you do not need much super. I have grown a good crop with 40lbs. super., but I think it is better to sow about 50lbs. I do not think it is any good putting more super. on any but fallow. We farmers have to build our land up by working it and making it give the full benefit of the seed and super. sown. I think land well fallowed will take nearly twice as much super. as new ground, and with the same season ought to yield from 6bush. to 8bush. more. I think the best wheats for here are Federation, Yandilla King, Bluey (Dart's Imperial). Federation is a good wheat, but do not sow it on sand. Keep it on the good land. Yandilla King will yield just about as good as Federation on the good land, and better on the sand. Bluey is about the best wheat for hay. It yields well, grows tall, and is no worse than Federation for rust. Bluey will weigh from 8lbs. to 15lbs. heavier per bag than Federation." During a lengthy discussion on the paper, Mr. Leahy among others spoke adversely on drilling before the cultivator, believing that better results were obtainable by the reverse method. In reply, Mr. Bowden said he had drilled part of his crop last season, and then cultivated it in, and at harvest time could not tell the difference between this and land drilled after the cultivator. Mr. Mitchell estimated that there were at least 7lbs. of cracked seed and other rubbish that did not grow to every bushel of ungraded wheat sown; hence the importance of having good, clean seed to secure good returns. With regard to pickling, some members thought salt was a beneficial addition to bluestone, as it tended to prevent rust, which was undoubtedly the cause of much shrivelled grain, and should often get the blame that was placed on lack of rain when the wheat was filling. It was generally agreed that Bluey was a good wheat for new ground, as it had abundance of flag for the subsequent burn, and also held its own *re* yield. [There is no satisfactory evidence in favor of salt as a pickle, either as a preventive of smut or rust.—Ed.]

Morgan, May 13.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), Hausler, Heppner, Hempel, French, Hurst, H. Wohling (Hon. Sec.), and one visitor.

HORSE-BREEDING IN CONJUNCTION WITH FARMING.—The following paper under this heading was read by the Hon. Secretary:—"In my opinion it would pay farmers to give more attention to horse-breeding. Horses are bringing a good price at the present time, and are in great demand in outside markets. Good, sound, young horses will probably continue to realise high prices. Farmers can breed their own horses much cheaper than they can buy them; therefore they should make it a practice to rear two or three each year. The best mares—well-shaped, active, and sound—should be used for breeding purposes. I prefer a good Clydesdale stallion, even if I have to pay a little extra for his service, as the foals generally take more after the stallion than after the mare. In this district a medium, well-built animal with fairly clean bone and good shoulders will do all farm work. Nevertheless, farmers will do well to keep both heavy and medium horses, the former being needed for wagon or road work. It is a great mistake to breed from very old mares. An old, worn-out mare will never produce as good stock as will a young

sound one. I do not believe it injures a mare to be carefully worked up to about a week or so before foaling. A mare in foal should not be allowed to get too fat, or she may go from two to three weeks over her time, and it will be so much the worse for her when she is delivered." Good discussion followed. Mr. Hausler considered the main consideration in horse-breeding was to secure a thoroughly sound stallion and breed from good stock. Other speakers agreed with the views expressed in the paper.

Parrakie, May 6.

PRESENT.—Messrs. F. J. Dayman (chair), Schmidt, Beelitz, Lee, Diener, Neindorf, C., O., and A. Heinzel, Threadgold, Brinkley, Gravestocks, J. Dayman, Hameister, Hall (Hon. Sec.), and two visitors.

HORSES ON FARMS.—The Hon. Secretary read a paper on "Farm Horses." He thought that, all things considered, the heavy draught horse was best for farm work in this district. Good strong animals were needed to work implements. They also gave most satisfaction when carting had to be done. Farmers should breed as many draught horses as possible, as this was a very profitable side line. Good mares would produce a foal every year and do a lot of farm work as well if properly cared for. Fillies should not be mated until at least three years of age, and they should then receive special care and attention to ensure their continued growth and development. In discussing the paper Mr. Neindorf thought five years was young enough to breed from mares. If mated younger the foals were generally weak. Mr. Diener favored the draught horse. Young stock should have special care to keep them growing. Mr. Lee thought draught horses were more suitable for carting than for farm work. The Suffolk Punch was a good active horse. It paid to breed early foals and feed them well. Several other speakers considered that while heavy draught horses were the most profitable to breed for sale, medium animals were best for general farm work.

Walkerie, May 15.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Odgers (chair), Jones, Burton, Rogers, Burroughs, Morgan, Lewis, Green (Hon. Sec.), and two visitors.

IRRIGATION OF FRUIT TREES IN APRIL AND MAY.—A discussion took place on the advisability of watering trees during the above months. Mr. Burroughs said he had noticed that he had fair crops when he watered in those months. Other members considered that summer pruning or weather conditions gave the crop; and that to irrigate in April and May, when climatic conditions were against them, was not advisable, and did more harm than good. Several members thought the advent of bees into the neighborhood had something to do with the better fruit crops.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, May 9.

(Average annual rainfall, 35.3in.)

PRESENT.—Messrs. Ricks (chair), T. and A. Jacobs, J. and C. Lewis, and Curnow (Hon. Sec.).

LUCERNE.—Mr. A. Jacobs inquired as to treatment of a plot of lucerne sown in March with barley. Should the barley be cut now or, if left until spring, would it destroy the lucerne? Members thought the barley should be left, as if cut now the frosts would probably kill the lucerne.

CUTTING TIMBER.—Mr. A. Jacobs read paper to following effect:—"To attain the best results in wood-cutting, it is absolutely necessary that the operator should have good

tools. These should consist of a crosscut saw, mall and wedges, and two axes—one to be used for chopping only and the other for splitting purposes. The former should be nicely shaped and set well back on a good straight-grained, well-rounded handle. It should not weigh more than 4½ lbs. It is a great mistake to think that more work can be accomplished with a heavy axe, because just as much can be done with a 4 lb. as with a 5 lb. axe, and with much less exertion. The 'Black-Kelly' is a very favorite brand, and one that can be recommended for wear and quality. Generally speaking, a good mall is the most difficult of a woodcutter's requirements to obtain. The wood should be thoroughly seasoned before using, and a piece not much larger than the rings to be used should be chosen, so that little trimming will be necessary to secure a good fit. As a rule, wood taken from the limb of an old tree will be found to wear longest. A piece of black peppermint or red mallee is most suitable. A mall, when new, should measure from 11 in. to 13 in. in length, and the handle should be 1½ in. in diameter. Many use an inch handle; but a very short trial with both is needed to convince one in favor of the former. A piece of black wattle or scrub sheoak will make a good handle. When using an axe the handle should be held loosely, and the arms and shoulders should be allowed to move with a free and easy motion. Some will say in regard to this that experience is the best teacher; but experience does not always make a good axeman. When falling a tree a large gash should always be cut out of the under side, or the side on which the tree is leaning, unless, for some good reason the cutter wishes to alter the course of the tree in falling, which can be done to a nicety by one experienced in the work. Then the top or other side can be cut through with saw, or axe, as desired. On no account should the feller run from the tree when falling, but should stand quietly by and watch, ready to step aside if the tree is likely to kick back in its descent, or roll when it strikes the earth. When splitting logs it is best to have a sawn end to work on especially if the log is large. Whether a log is to be split for posts or firewood, it should be first burst fairly through the centre from end to end. Although wood-cutting can never be made easy work, much can be saved in the way of time and exertion by attention to these points." Members generally agreed with the paper

Clarendon, May 8.

(Average annual rainfall, 33½ in.)

PRESENT.—Messrs. Spencer (chair), Morphett, Hilton, Sheidow, Piggott, A. A., H. C., and E. A. Harper, White, and Phelps (Hon. Sec.).

RUPTURE IN FOAL.—In reply to inquiry *re* treatment of navel rupture in foal, the Government Veterinary Surgeon advised the application of a pad and bandage, properly adjusted, to keep the pad in place. Some of the members stated they had found it difficult to keep the pad in position.

BLACKBERRIES.—Mr. Sheidow stated that he had destroyed a patch of blackberries by covering it with a thick mass of boughs to prevent the light getting in, and then, after a time, setting fire to them.

IRISH BLIGHT.—Mr. Morphett called attention to recommendation of Mr. McAlpine, of Victoria, to subject seed potatoes for three hours to a dry heat of from 120° F. to 130° F. This treatment would destroy any spores of Irish blight on the potatoes. [Mr. McAlpine reports having proved this treatment to be effective in destroying the fungus; but it is not claimed that it will protect the resulting crop from attack. The object of the treatment is to ensure that the disease is not carried in the seed.—ED.]

GOVERNMENT PULPING PLANT.—The members of this Branch indorse the proposals of Forest Range Branch, and will support a Government pulping and jam factory if established.

Forest Range, May 11.

(Average annual rainfall, 36 in.)

PRESENT.—Messrs. Vickers (chair), J., A., E., and R. Green, McLaren, Pollard, Rowley, Sass, and Monks (Hon. Sec.).

WOOLLY APHIS.—The Chairman introduced for discussion the matter of the prevalence of this aphid this year. Mr. Rowley had worked salt into the soil around the stems of the trees, with satisfactory results. The Hon. Secretary had noticed that recently the aphid was disappearing, and he thought the birds were eating them down. Nevertheless, there

were not sufficient birds to keep them under. Possibly the birds spread the aphid from tree to tree by wiping their beaks on clean branches. Mr. McLaren had spread slaked carbide around the trees near the roots, and had rubbed some on the trees where blighted. This treatment had been very effective.

BITTER PIT.—Some discussion took place concerning the cause of this trouble. That it could be entirely due to the use of poisonous sprays members considered ridiculous, as several of them had experienced bitter pit in their apples many years before spraying was practised. Messrs. J. Green, Vickers, and the Hon. Secretary had all had this experience.

Gumeracha. May 8th.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. Porter (chair), Moore, Kitto, Norsworthy, B. and A. W. Cornish, Monfrics, Randell, Hanna, and Lee (Hon. Sec.).

POTATO CULTIVATION.—Mr. A. Moore read a paper to the following effect:—"The large quantities of potatoes which have been grown here place the suitability of soil beyond question. That more has not been done is due to the fact that other districts, such as Mount Gambier, are even more adapted in breadth of area and easy working for potato culture, raising more tons in proportion to expenditure of labor and capital. On the other hand, we are nearer the city market, and, given railway facilities, we should be in a position to compete with any district in the State. Hitherto our operations have been largely limited to our gullies and black flats, but there is no reason why we should not utilise more of the hillsides, which are easier to work, better drained, and if not so rich in plant food, would respond readily to the application of a heavier dressing of manure. These higher levels worked in connection with the flats should give us a digging season from December to May. The great difficulty in early planting is the danger of frost and the extra work in combating weeds. I would therefore rather recommend delaying the planting as late as possible, getting the soil in good condition by deep and frequent cultivation. Usually in this district we get sufficient rain during the summer months to keep the plant nicely growing, providing the necessary cultivation has been applied before planting. I have seen nice crops of summer potatoes growing on steep hillsides this season, and as we have plenty of this land available for potato-growing our output might be considerably increased, especially in view of the fact that good prices are likely to rule for some time to come. The ravages of Irish blight throughout the Commonwealth means a serious shortage in the supply. In to-day's paper it is stated that in Victoria there are 20,000 acres of diseased crops, and all the States are affected in parts. We, fortunately, are a clean district, but it is up to us to make the most of our opportunity. The question of seed is a serious one, and I strongly advise utilising the seed grown on your own farm, or getting it from your neighbor. The danger of bringing the disease with imported seed must not be overlooked. Although a change of seed is considered good, the risk is too great. We should at any rate, by procuring seed from our own district, keep our fields clean from blight as long as possible. The past season being a very wet one has had its effect on our crops. They have suffered from a sort of scab which, while not seriously affecting the potatoes, certainly spoils the look of it. Some sorts, notably the New Zealand Pinkeye, are badly affected, but the Up-to-Date is not nearly so bad, the peculiarity of the whole thing being that in two plants adjoining each other one may be clean and the other scabby. I believe the heavy rains which fell in the first week of March did the mischief by stimulating an abnormal growth. The better condition the soil is in, the less liable to many of these small ailments. Crickets do a lot of damage if the soil is lumpy. I find, too, that if the rows are not fairly well banked many of the potatoes at the surface get sun-scalded, or a green tinge on the surface exposed to the air, and as appearance counts so much in the market, it is well to do all we can to grow the perfect tuber. I do not lay down any hard and fast rule for planting. The sets about 18in. and the rows 24in. I say the rows 24in. apart because my implement for banking does better work at that distance. My suggestion therefore is arrange your method of planting to suit the requirements of your horse hoe and banker. For our low-lying flats I would underdrain with green saplings, stringybark preferred, being long and straight. Half a dozen poles laid in well under plough line and covered with the boughs is the cheapest drain, and effective to boot. Subsoiling would have the effect of keeping the soil more friable. If you want to give your potatoes the best market appearance, wash them." In the discussion which followed several members expressed the opinion that in view of the state of the labor market it would be necessary to use labor-saving machinery such as

the potato-planter and the potato-digger. Mr. B. Cornish had used the latter machine in deep, sandy soil, and although some were left in the soil and others bruised, it paid to use it. He did not think the varieties now grown yielded as well as those kinds grown in former years. Mr. Monfries said his Pinkeyes were affected by scab, but Redskins alongside were very clean. He found he could not get any more for washed potatoes and thought they would not keep so long as those not treated. The potato-planter appeared better suited for whole than for cut seed. Mr. Randell said the land must be well worked and heavily manured to produce profitable crops. The mechanical planter and digger had been tried and abandoned by the largest growers in this district. Mr. A. W. Cornish thought much of the trouble this year with potatoes was due to the unseasonable weather. Mr. Kitto mentioned that he had seen the potato-digger at work in another State, and thought if there were more trials of it here it would be more largely used by growers. Mr. Hanna advised planting on high ground in September and on the lower levels in December and January. There was not so much labor attached to potato-growing as some thought. They should be very careful in buying seed potatoes. He noticed that the light-colored potatoes suffered more from scab than the dark varieties. Mr. Norsworthy thought it would pay, in spite of various pests, to stick to potato-growing. He had sold as low as £2 per ton, and was then not out of pocket.

Hartley, May 13.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Wundersitz (chair), Brook, Hudd, Tydeman, Pratt, Clark, Symonds, G., and T. Phillips, Bermingham (Hon. Sec.), and one visitor.

DAIRYING AND WHEAT-GROWING.—A long discussion took place on which paid best on a small farm, dairying or growing crops. Members were of opinion that dairying paid best, but only the best cows should be kept. Every cow's milk should be tested, and if it was not up to the standard she should be fattened off. Some of the members objected to dairying because it was such a tie, but most admitted it paid best.

ATTACHING HARROWS TO PLOUGH OR DRILL. After discussion on this question, as to whether it was advisable to attach the harrows behind the plough or drill, members were unanimous that the practice was worth a trial, even it meant a horse extra in the team, as it saved a lot of time and labor and meant that seeding would be over much sooner, as harrowing was heavy work on both horses and driver.

FOXES.—The Chairman reported that foxes were very bad on his lambs this season; he tried putting a dab of tar on the back of the lambs' necks and thought they were not so bad since.

LIME AND CEMENT.—Members would like to know if lime and cement would work together, or if one killed the other in concrete floors, &c. [The Superintendent of Public Buildings replies that it is **unadvisable** to mix lime and cement for concrete floors.—Ed.]

Kanmantoo, May 6.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. Downing (chair), Hay, Pym, Shepherd, Wooley, R. Downing, Shepherd, Talbot, Critchley, J., A., and W. Mills (Hon. Sec.).

COMMERCIAL MANURES.—The following paper on "Manures" was read by the Hon. Secretary:—"There have been many kinds of artificial manures used in this State with various amounts of success, and some with no success at all. The manure that has been of most value in this district is phosphate in the water-soluble form. There are many brands of superphosphate on the market. For the drier lands I always reckon the value of a manure by the percentage that is water-soluble. Some people like one brand better than another. I think it will be generally found that the highest priced manure is the cheapest. A manure guaranteed 38 per cent. and costing £4 2s. 6d. a ton will cost 2s. 2d. for each 1 per cent. water-soluble phosphate, and a manure guaranteed 30 per cent. and costing £3 10s. a ton will cost 2s. 4d.; so that the 30 per cent. line costs 2d. more for each 1 per cent. water-soluble phosphate than the 38 per cent. line, besides the extra cartage on the lower grade manure. Some brands of phosphate go over the

guaranteed percentage. One sample is quoted in the *Agricultural Journal* as being 10 per cent. over the guarantee. I do not think much would be over the guarantee, or the agents would see that their guarantee was raised. The *Journal of Agriculture* will give farmers a good idea as to which brands are up to or over the guarantee. Superphosphate must be free from all lumps. Even small lumps do harm. One plant will get a lump and the next in the drill furrow will only get a small share. The local product is, as a rule, the most free running. The imported line having to be stacked in the ships for the voyage, gets pressed into lumps which could only be broken up by regrinding. In my opinion the best way to make the grass grow after the crop is harvested is to sow about 1cwt. of Kangaroo Island guano with about 80lbs. of phosphate to the acre when sowing. This mixture will last for several years. The grass after phosphate by itself will be found to go off after the second year. In experiments we have conducted basic slag has given good results. This manure is very heavy and free running. It is a good manure to mix with super. if the latter is at all sticky, and ensures a far even sowing. I have tried potash manures, but have not found them so much good." The writer then quoted from an article by Dr. Dyer at some length concerning potash manures, and continued—"Potatoes are more likely to be grateful for potash than any other crop, and every farmer who grows potatoes ought to convince himself by experiment that potash will not do his potatoes good before deciding to do without it. It is very easy to sow a few rows with sulphate of potash before the sets are planted. Guano super. has a good percentage of acid-soluble phosphate, and as far as my experience goes will do a lot of good in the wetter parts. I have found bonedust much the same as guano super. in results. Gypsum has not been of much value to wheat crops, but I think it would be of use in many ways in a garden. I have found that the most profitable way to grow wheat in this district is to use about 80lbs. of 33 per cent. super. to the acre on average soil. I would, however, put more on old soil and less on new land. If you put too much phosphate on new land the crop is very likely to blight off. Some people seem to think that if they sow super. with their crop they have done all that is necessary. I have no hesitation in saying that all the artificial manures in the world will not do much good unless backed up with good cultivation and good seed. I should like to see the members of this Branch combine to improve their seed. This, by selection, can easily be done. Each member could take one variety and then exchange seed." (Considerable discussion followed. One member wished to know whether hay grown with heavy dressings of super. would have a bad effect on horses' teeth and cause the animals to scour. Other thought the use of super. was productive of poor milling wheats. [The heavy dressings of super. given to the hay crop could have no deleterious effect on the horses' teeth. Neither would this have a bad effect on the milling quality of the wheats.—Ed.]

SELECTION OF SEED.—Members agreed to combine to try to improve their seed wheat by selection.

Longwood, May 13.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes (chair), Glyde, J. and W. Nicholls, Pritchard, Doley, Blakley, Furness, Vogel, Roebuck, and Coles (Hon. Sec.).

HOMESTEAD MEETING.—This meeting was held at the homestead of Mr. J. Nicholls. Mrs. Nicholls kindly provided tea.

TREE-GRUBBERS.—A trial was made of the rack or ratchet tree-grubbing machine. Members took a hand in manipulating the appliances, and were convinced that for economy and saving of labor the invention was a good one.

Lyndoch, May 11.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. Mitchell (chair), Klauber, Warren, Woolcock, Burge, A., H., and E. Springbett (Hon. Sec.).

BITTER PIT IN APPLES.—Some discussion took place concerning the possibility of spraying compounds being responsible for bitter pit in apples. Members were of opinion that the spray could not be the cause, as the complaint had been noticeable in this district before spraying had been practised in this State.

Meadows, May 10.

(Average annual rainfall, 34½ in.)

PRESENT.—Messrs. Ellis (chair), (Griggs, Nicolle, Brooks, Kleeman, and Bertram (Hon. Sec.).

WASHING SHEEP BEFORE SHEARING.—Mr. Nicolle read an interesting report from the *Australasian* on the Langavilla (Victoria) Station, particularly in respect to the operation of washing the sheep in rainwater prior to shearing. This is the home of one the best Victorian fine-wool flocks, and the only estate in Victoria where this practice is adopted. Forty years ago the flock averaged 2lbs. 8½ozs. of washed wool; last year the return was 4lbs. 11½ozs. This improvement has been brought about by many years of careful selection and management, and without departing from the original type of plain body and fine wool. At the February, 1910, London sales 13 bales of washed lambs' wool realised 4s. 0½d. per pound, and it was stated by one of the leading Bradford experts that this was a record. The process of washing in warm soapy rainwater is thus described:—"The sheep enter the hot water by a slide that drops them in a square tank of limited capacity, which forms one end of a long wooden trough, 5ft. deep and about 18in. across. This trough is divided into compartments to hold three or four sheep in each division, and is filled to the brim with hot, soapy water. The washers stand on a platform set at the most convenient height for their work, one man to each division, and pass the sheep along to the far end, where another hand gets to work on the softened tip of the fleeces with an ordinary horse currycomb. Experience has proved how much of the dirt and grease can be removed by hand-washing and when the comb must be used. The water is kept at a temperature of approximately 108° F., the inflow of water and soap solution being more or less automatically regulated. The trough is emptied and refilled at regular intervals. On completion of the process the sheep are mechanically raised on to a stage, whence they slide down into a large cold water tank. In this tank six 'spouters' stand in wooden barrels up to their chests, well-protected with waterproof coverings, two to each 'spout,' one at each end. The spouts take the shape of inverted T-heads, and are wide enough to cover the whole length of the sheep's body. As each sheep drops down it is caught and placed on a platform made of two drums which revolve in response to the turning movements of the extended sheep. The back is treated first and then the extended body is turned around slowly under the descending water. One minute under the spout is the average treatment, and during that minute about 800galls. of cold water descends at a considerable pressure on each sheep. The animal is then passed out up a long batten race and emerges almost snow white to undergo a natural process of dripping and drying in a clean paddock. Four or five days later the animal is ready for shearing. That this particular form of warm water washing pays the experience of many years proves." An interesting discussion followed. Several of the members expressed regret at the absence of the most important details of this process, viz., the quantity of soap per gallon; temperature of water for lambs as compared with grown sheep; how long the sheep were kept in the bath; how often the water was changed; and the cost of the operation.

Meningie, May 13.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. I. Williams (chair), Dainty, Taylor, Wright, Scott, Hill, Williams, Hiscock, Botten, Tregilgas (Hon. Sec.), and four visitors.

WHEAT-GROWING.—The Hon. Secretary read a paper on "Wheat-growing." If unable to fallow he would plough his soil as early as possible so that it might become sweetened, and then just before seeding would cultivate it to a fine tilth, and at the same time destroy the weeds. Considerable judgment was necessary in seeding, and consideration had to be given to the variety of wheat, the district, and the prospects of an early or late season. He would never use other than graded seed, and would not sow more than 20lbs. per acre. He considered superphosphate an unsuitable manure for land which had not a retentive subsoil, as, being a soluble manure, he thought most of it would leach away out of reach of the plants. Where he desired to apply this manure he would try to improve the drill so that it would broadcast the manure instead of placing it in a narrow groove. The present-day practice had the effect of discouraging stooling and the roots of the plant from spreading. For this district he would only put in half the manure with the seed.

When the plant was fairly well established he would run over it a set of harrows (reversed) to loosen the soil and kill some of the weeds. After this he would graze the crop with sheep, even if he had to borrow sheep for the purpose, and by about the end of July would have it eaten down quite bare. Then he would put on the other half of the manure and run the harrows over again. If he used a stripper or harvester he would also have a binder at work getting all the stubble possible. This he would chaff into a silo with lucerne or other green stuff and make ensilage for use in the summer. Cocky chaff could be used in the same manner. If unable to get green fodder for this purpose he would stack his straw, and chaff it as required, mixing molasses with it for the stock. Immediately after harvesting, unless the soil was liable to drift, he would again have the plough at work, as he was a great believer in exposing soil to the atmosphere. In the discussion which followed the Chairman favored the suggested method of applying manure, but did not think it would pay to out the straw. Mr. Hiscock considered it doubtful whether the extra trouble of applying the manure in two lots would pay.

Mount Pleasant, May 12.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Giles (chair), C. and C. O. Royal, Phillis, Maitland, Thomson, Langford, Godfree, Fulwood, Vigar, Tapscott, Maxwell (Hon. Sec.), and one visitor.

WHEAT FOR HAY.—Some discussion took place as to which varieties of wheat were best for hay in this district. Some favored Gallant or Majestic, while others preferred Dart's Imperial and White Tuscan.

LOSS OF LAMBS.—It was reported that a number of lambs had been lost this year, owing to the cold weather experienced.

STOCK REPORT.—It was reported that stock were in better condition than was usual at this time of the year.

Uraidia and Summertown, May 1.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. Hawke (chair), F. Y. and R. N. Cobbledick, G. F. and H. F. Johnson, Hart, Moulda, P. C. and T. Day, Rowe, Collins, and Snell (Hon. Sec.).

QUESTION DAY.—The following questions were dealt with and answers furnished as below:—

What is the best time to manure gooseberries? Some thought early, just before the first rains, but most considered later, about August, would be better.

What are the names of best early apples for this district? (1) Williams's Favorite, (2) Margaret, and (3) Early Astrachan and Irish Peach.

Can vegetable-growing be carried on with artificial manure only? Members thought that it could where there was a large enough area to allow a portion to rest periodically; but not where intense culture of all the holding was practised as in this district. If more green crops were ploughed in, less stable manure would be needed.

Would it be beneficial if the present Monday market were abolished? The general opinion was that Tuesday, Thursday, and Saturday only would be a great improvement, and that the gardeners should combine efforts to get this alteration made.

What is the best means of getting rid of sorrel? Some thought by applications of lime, but most considered that it could only be kept under by constant cultivation.

Does it pay to grow bunch vegetables for less than 1s. per doz.? Members thought parsnips and swedes should have a minimum price of 1s. 6d., and other bunch stuff 1s. per doz.

What is the best hay wheat for the Hills district? [Professor Lowrie recommends White Tuscan as a hay wheat for the Hills district.—Ed.]

In reply to the following question—"Do you know of any neglected gardens in this neighborhood, which are breeding places for pests, and, if so, how would you propose to deal with them?" members said they knew of some, but that if they were reported, the measures taken were too drastic, so it was better not to report. [This was shown

to Mr. Quinn, who said that he could see little difference between breeding pests in one's garden to destroy a neighbor's fruit or put him to increased expense in saving it and robbing that neighbor of his income in coin of the realm. Although generally considered an unneighborly action, every fruitgrower whose plantation adjoins a neglected and pest-infested one should assist the Government to enforce the law. When some time ago growers were punished for distributing infested fruits many such neglected trees disappeared or were given closer attention.—Ed.]

Willunga, May 6.

(Average annual rainfall, 25½ in.)

PRESENT.—Messrs. Pengilly (chair), Binney, Waye, Blacker, and Hughes (Hon. Sec.).

IRISH BLIGHT.—This subject was introduced by the Chairman for discussion. The opinion of some members was that a lot of loss attributed to that disease arose from other causes. Instances were given where crops had gone right off and were not dug. Later on a self-sown crop came on and yielded splendidly not a rotten one amongst them. In cases where it was unmistakably Irish blight no self-sown appeared—every tuber apparently rotted away. Mr. Pengilly mentioned having obtained 21 cwt. of potatoes from 1 cw. of seed. The variety was Up-to-Date, imported seed; the growth of tops was very rank and coarse.

SOUTH-EAST DISTRICT.

Kalangadoo, April 8.

PRESENT.—Messrs. Crouch (chair), Riddoch, Earle, McCall, Gibb, Kennedy, Mitchell, Bennett, Boyce, and Sudholz (Hon. Sec.).

SUMMER FODDERS AND RYE GRASS.—An excellent paper dealing with the "Growing of Fodders" was read by the Chairman. At the outset he spoke of the value of turnips as a fodder, and dealt with some of the crops grown in New Zealand. The paper then continued:—"I have grown rape and kale at Lowan. I had 100 acres ploughed and harrowed, and in October, 1906, put in 3 lbs. rape seed and ½ lb. white mustard to the acre. On the 2nd January following I put in 1,600 sheep, and these had the patch eaten off by the 15th February, when I removed them and gave the rape three weeks' spell. I then put in 600 sheep for five weeks, and afterwards gave the crop a month's rest. Then I put on 480 ewes, which remained in the paddock till the lambs were marked, and from that time I had two sheep to the acre on the plot for the remainder of the year. I found mustard of no use, as it was seedling when the sheep were put into the paddock on January 2nd, therefore there was no feed from it. In October, 1907, I put in 126 acres of rape with similar results to the preceding year, the only variation being that when the land was bare in April I cross-drilled in with the hoe-drill 1 bush rye grain and ¾ cwt. of super to the acre and had no stock on for several weeks to let the rye get well established. In the spring time of 1908 the rape went to seed in spite of having six sheep to the acre on it. I had to put in a lot of cattle to smash it down, as it was over 5 ft. in height. One year I put in kale in October and fed it for over 18 months, with spell at intervals to let it recover. Rye or any other grass should not be sown with a crop in this country, as the grass does not stand a chance with the crop; and, again, as crops are cut in the dry weather, the sheltered plants cannot stand the exposure. It is best planted by itself, but it must be well established before putting stock on to graze. One great point in the sowing of grass seed is that the land must be well harrowed and sown, and be given a chain or brush harrowing to lightly cover the seed. The ground must be well rolled. In New Zealand

they sow 2bush. of rye grass seed to the acre. Italian rye grass weighs 18lbs. to the bushel and Perennial 20lbs., but if either go over these weights it is of better quality. In this country I think 1½bush. should be a good seeding, but it must be remembered that the thicker the grass is sown the better the pasture and the check on the weeds. Mangolds sown in October are not suitable for feeding off until the autumn is over. Maize grows an abundant crop, is very useful summer fodder, and should be more generally grown. Sorghum is also a useful summer fodder, but great care must be used in feeding it off, as in certain stages it has a very bad effect on cattle, and often causes death. I saw a mob of wethers in the Melbourne market that had been fattened on sorghum, and they certainly were a very fine lot. We all know rye grass to be a good fattening fodder, but it does not grow the bulk of feed that cocksfoot and Timothy produce. The Italian variety yields a big bulk of feed, but it does not last more than one year. The seed is distinguished by having a point similar to broome or goose grass. When purchasing rye grass do not buy the seed that is big in bulk but light in weight, as this is off new pasture. If you want rye grass that will be perennial, buy the small dark seed. I put in rye grass of this description in land in New Zealand and could not get any machine to cut it, as a small quantity of clover had grown through and made a mat, so I fed it off with cattle. In the following September I closed up the paddock and there was such a heavy growth that I could not cut the crop. The next year I fed it until October 1st, and it again grew a great crop, and I was able to harvest it with a binder. For sowing turnips we mix seed and manure in the box, and when empty mix again. Never on any account leave seed and super. mixed in the box over night, as super. kills the germ of the seed. I tried gypsum at the rate of 1cwt. and 2cwt. to the acre for rape, and could see no difference in quantity grown, nor could I see any difference between the rape sown side by side with gypsum and superphosphate. I would like someone to try turnips next spring in sandy loam that would not get too dry in summer, and, provided no green caterpillars attack them, I feel sure the crop will repay the grower." The paper was well discussed. Mr. Riddoch said he had grown rape on large areas, but was not satisfied that climatic conditions were too suitable; it was always subject to injury by the "fly." Members did not consider perennial rye pasture of much value after the third year.

Lucindale, April 22.

(Average annual rainfall, 22½in.)

PRESENT.—Messrs. Rayson (chair), Tavender, Natt, Dow, Beaton, McInnes, Carmichael, and T. W. G. Secker.

FRENCH WHEATS.—A report by Mr. Tavender on the French wheats grown by him for the Kybybolite Experimental Farm, season 1910-11, was read as follows:—"Four plots of one acre each were drilled in on May 24th with 1½cwts. Jap. super. and 1bush. of seed per acre, pickled with a 2 per cent. solution of bluestone (or 2lbs. to 10galls. of water). Heavy rains fell on May 25th, and prevented me from harrowing after the drill; consequently, the birds had some of the seed, especially the White Marvel. All came up fairly evenly on the 5th June with the exception of Sensation, which appeared much stronger than the others.

"Plot No. 1 (Treasure) got a good start in June and then went very yellow during the very wet weather in July and August. It made a growth in June equal to that of Cape barley, and struck me as being good to grow for early green feed; but during the wet and cold weather I thought it would be a failure. However, it recovered as soon as the spring weather came, ripened with a good head, and was reaped on the 8th January, yielding 10bush. to the acre of good sample wheat. This plot was reaped eight days before the others, and had less exposure to heavy winds.

Plot No. 2 (Sensation—a red wheat).—This came up stronger looking than the others, and went off very yellow until spring, and was reaped eight days after No. 1 owing to dull weather, and during that time some of it shook out, some of the ears being half bare. This liability to shake out seemed its drawback. It yielded 9bush. good sample wheat a trifle bleached.

"Plot No. 3 (Red Marvel—a red wheat).—This came up weaker looking than the two previous kinds, but did not go as yellow and the climate seemed to suit it better. It was reaped on the same day as No. 2 plot, but had gone down a little and some grain had shaken out. This wheat was also bleached. It yielded 9bush. sample wheat."

"Plot No. 4 (White Marvel) came up rather poor looking, but kept coming along, and did not go yellow looking like the others. It was reaped on the same day as No. 3 plot, and had gone down very much owing perhaps to being very thin in places, due to birds. It yielded 9bush. of good sample wheat. This one seemed to me to suit the season's conditions better than any of the other kinds, although it did not yield so much as Treasure. The season was a disappointing one to everyone in the district. The weather during June was ideal, one of the best Junes I have known; but the rest of the winter was too wet and no frosts. The result was that the wheat plants were checked for a time and the weeds got ahead of them, and in some places quite choked them out, and they died off. Smut was also prevalent and did some harm. Red rust was to be seen on all these wheats, and on Federation growing alongside, but it did no harm to the ear as far as I could see. These plots have a southerly aspect, and the wind this season from that direction has been appalling. The Federation wheat growing alongside these plots under the same conditions (except $\frac{1}{2}$ cwt. super. less per acre) averaged 6bush.

Millicent, May 9.

(Average annual rainfall, 28 $\frac{1}{2}$ in.)

PRESENT.—Messrs. Holzgrefe (chair) and Acting Sec.), Oberlander, Mutton, Bowering, Serle, and Day.

CONFERENCE ECHOES.—The delegates of the Naracoorte Conference (Messrs. Holzgrefe and Day) reported upon the proceedings there in terms highly eulogistic of the usefulness of the meeting, but both regretted that the attendance of the general public was so small. Mr. Holzgrefe considered that a defect was the absence of any paper or speech with reference to sheep. The keynote of the whole proceedings, in the delegates' opinion, was Professor Lowrie's declaration that until the South-East was thoroughly drained it would pay the landholders to confine their energies to grazing pursuits and the cultivation of fodder crops, instead of attempting to grow cereals under existing conditions. This remark was amply justified by Mr. Colebatch's references to the experiments at Kybybolite.

EXHIBITS.—Mr. Day tabled a sample of African veldt grass, grown on his land at Mount Muirhead. He also showed a fine sample of apples. Mr. Oberlander presented a clean and inviting looking sample of Redskin potatoes, which were grown with 1cwt. of sulphate of iron to the acre as a fertiliser.

Mount Gambier, May 13.

(Average annual rainfall, 31 $\frac{1}{2}$ in.)

PRESENT.—Messrs. Sassanowsky (chair), Smith, Engelbrecht, Ruwoldt, Watson, Wedd, Pritchard, Major, Dow, Keegan, Buck, Kennedy, Wheeler, Schlegel, Innes, G. and D. Collins (Hon. Sec.).

CULTIVATION OF TURNIPS AND MANGOLDS.—Mr. W. J. Colebatch, B.Sc. (Agric.), delivered an address on the cultivation of turnips and mangolds. [This address will be printed in full in the front portion of our next issue.—Ed.]

Naracoorte, May 13.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Coe (chair), Williams, Jangeludecke, jun., Rogers, Munro, Caldwell, Wright, Loller, and Schinckel (Hon. Sec.).

SORE SHOULDERS IN HORSES.—Mr. W. E. Rogers inquired what was the best remedy for sore shoulders in horses. Mr. Schinckel said there were a number of remedies, but he found the most effective was to use what was known as a false collar. There were, of course, remedies for healing the sores. Mr. Munro said that bathing the sores with a strong solution of brine would be found very beneficial. This was also good for sore backs.

GENERAL CULTIVATION OF THE SOIL.—Mr. W. Loller said he had a few object lessons to place before them from practical experience gained by following farming pursuits for many years, more particularly to the North, but they would be applicable to the same conditions in the South-East. Forty-five years ago, when he was a boy, they used in the State to plough with a single-furrow plough, and they took great interest in doing what now might be termed fancy work. He remembered on a piece of land near Roseworthy, with the object of giving a neighbor a lift who had got behind, a number of them ploughed and harrowed different lands in one paddock. The ploughing varied, and some work was much better than others. He remembered there was a great difference in the packing of the soil to the way in which it was done nowadays, and the ploughing that packed the soil best returned the best crops. Another object lesson that struck him very much was in connection with a flock of sheep that went across a crop which had been put in. The farmer summoned the owner of the sheep for damage to his crop, and he was awarded damages. The crop was allowed to take its chance, and the very place where the sheep tramped across the crop turned out best. The tramping had solidified the ground, and this was what the ground required. It was necessary that the packing should be even for the grain to come up well, and there should be no patches left. He had another object lesson on this point. He was putting in at Roseworthy 640 acres of crop with two four-furrow ploughs, pulled by six horses each. The way in which they ploughed the field necessitated the horses tramping across a portion of the field, and where the horses tramped the soil the wheat came up well, and there was a much better crop than in other parts where it was not tramped. This showed to him the necessity of having the ground solid to obtain a good crop. He had another object lesson in cultivation at Black Rock, a well-known farming district in the North. He ploughed an average depth of 4in., and did the work well. One farmer, who came from Kapunda and took up land in the neighborhood, merely skimmed the surface in ploughing, and the next harvest he had far and away the best crop, and the others who did good ploughing scarcely got anything. There was a general idea that deep ploughing was necessary to get good crops, but he would impress upon all farmers that different conditions required different cultivation or different ploughing. Then they would ask why the man at Black Rock who only ploughed 1½in. got a good crop, and those who ploughed 4in. to 5in. got scarcely anything. That was easily explained. New land did not want deep cultivation. The best stuff was on top, and if they went to a depth of 4in. to 5in. they turned up the sour soil, and the grain did not come through it. If the top soil was just turned over the grain found more fertile conditions. He had another experience at Barunga on land different to that at Black Rock, being a much lighter soil. One man—a real good farmer—ploughed 4½in. deep, and turned up about 2in. of clay. He was farming some land near him, and, remembering former experience, he ploughed only 2in. The result was that his neighbor got hardly anything and he had a good crop. They should be careful not to move too much cold clay in ploughing. Mr. Langeluedecke, jun., asked how the man with the deep ploughing fared next year. Mr. Loller said he grew nothing for three years running; then his land began to show some improvement through the soil being well worked, but it was at great cost. He had among his notes some tests in cultivation he made at Northfield, six miles from Adelaide, where he had 19 years' experience in charge of a farm. When he went there they were accustomed to spread manure first, then plough a depth of 5in., cultivate it with the scarifier, and then put the seed in. His plan was to plough 3in., work it down with the scarifier, when seed time came put the manure on top with Kemp's spreader, then put a paring plough on, sow the seed, and roll it afterwards to break the surface. Slaughter-house manure was used. By the old plan 1 ton per acre of hay was obtained; by his method a 3-ton crop was cut. They would ask why the different results. Simply because in the old method of cultivation the manure went downwards away from the seed; by his method the manure kept with the seed and gave it its full fertilising power. He remembered at Northfield a farmer who fallowed a section and grew watermelons and peas on it, worked it with a scarifier, ploughed it again 4½in. deep, harrowed it, and left it to the crop, with the result that his crop died off. The cause, in his opinion, was nothing but too much cultivation, which had the effect of keeping the soil too loose. He had a crop alongside of him put in in the manner already described which returned 5 tons to the acre, and his neighbor obtained next to nothing. He did not for a moment wish it to be understood that he was against good cultivation. They must, however, be careful to see that the soil was not cultivated to such an extent that it became too loose and remained ashy. He believed that this looseness of the soil was the cause of the disease known as takeall. The land wanted to be worked firm. They should be careful in working the soil in wet weather, especially in harrowing. After the soil becomes dry a crust will form on the top, and this prevents the plant from coming through. The cause of this crust was the soil being

too fine on top, and the ground not firm enough all through. In most cases the surface required breaking with a roller; or harrow the ground, when the crop will come up. He had not had much experience in the South-East, but there were some seasons they had too much moisture, and other seasons they needed to conserve moisture. He had an idea there was too much rough cultivation in the South-East. They required equally as firm a seed bed in the South-East as in the North. They required to keep their land thoroughly tight and level, and plough in the direction of the fall of the land—not cross-ways—and they would find that in wet seasons the water would run off the surface of their land more quickly, and in dry seasons they would conserve more moisture. In wet districts like Mount Barker they ploughed half-chain lands in order to get the water off. In ploughing in wet country they should throw their crown well back, and see that their soil was well packed. The speaker then dwelt on the best kind of implement to plough with. The long board plough was a great mistake. For good cultivation they required a short board and a broad share; then they could plough any depth and pulverise the soil thoroughly.

Penola, May 6.

(Average annual rainfall, 26½ in.)

PRESENT.—Messrs. Peake (chair), Miller, Richardson, McKay, Alexander, McDonald, Gee, Boyle, Adamson (Hon. Sec.), and one visitor.

MERINO SHEEP.—A paper under this heading was read by Mr. Boyle. The writer first proceeded to describe the features to be looked for in good Merino sheep, and then said he always liked to see a heavy fleece on the ribs down to the underline. The belly wool should be similar in quality and bulk to that on the sides. Weak belly wool was a serious defect. Sheep showing any decrease in length or density in the back wool should be avoided. He thought it best for farmers to breed Merinos carrying wool of about 60's count quality. It was very necessary in sheep-farming to avoid overstocking, as a poorly-fed sheep could not grow a strong, healthy fleece of wool. Land that would carry one sheep to the acre or two to three acres was best for Merinos. Richer land should be reserved for the long-woolled breeds. A good general discussion followed.

Tatiara, May 20.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Saxon (chair), Low, Campbell, Kilmartin, Wilson, Duncan, Bond, Reschke, Prescott, Milne, Staude, Truman (Hon. Sec.), and one visitor.

FEDERATION WHEAT FOR HAY.—Mr. Low reported that, as promised, he had chaffed some Federation hay, and so far as he could see, the horses did as well and appreciated it quite as much as chaff from other varieties.

SUBSIDIES TO AGRICULTURAL BUREAU BRANCHES.—Mr. Wilson said members of the Branches gave a good deal of time, often at considerable inconvenience, to discuss matters connected with the advancement of agriculture in the State, and he did not think it fair that they should, in addition, have to pay out of their own pockets the various expenses incidental to Bureau work. Further, he thought the Hon. Secretary should receive some remuneration for his work, and he thought they should ask the Minister to grant an annual subsidy of £5 5s. to each Branch. This proposal met with approval of members, and it was decided to ask other Branches to consider the matter.

WORKING CRAB-HOLE COUNTRY.—Mr. Wilson read a paper on the best means of getting rid of the water from the wet crab-hole country of which there was a large area throughout this district. Where the land had a fall in any given direction, efforts should be made to drain it either by permanent drains or by ploughed-in narrow lands well crowned up, the furrows being cleaned out with a single-furrow plough after the crop is up. He had seen this plan carried out with success in the Hills districts. In the Tatiara their black soils were the most productive when prevented from becoming sour and sodden, and it would pay them to give serious attention. He believed there were thousands of

acres that could be made to yield double the present average returns. Of course, when the crab-holes are very large it would take years of cultivation to level the land sufficiently to drain it. In this district he thought the land should be ploughed up roughly and left exposed to the action of sun, air, and wind, as sweetening and mellowing of the soil was of more importance in this district than the conservation of moisture. He would feed the fallow down during the summer to prevent the growth of weeds, and then work lightly before drilling in early in the winter. The paper was well discussed. Mr. Sullivan said that in the Lower North he had better results from land fallowed rough than fallow worked down. In his opinion it was necessary to leave this land rough to sweeten it; he would keep the land clean with sheep. Mr. Reschke disagreed. His only chance to get a good crop was to work to a good tilth. In an experiment which he had conducted on 50 acres, he got 21bush. per acre from well-worked fallow and only 6bush. from that left rough, most of the crop on the latter consisting of deadheads. He did not like narrow lands, as it paid to get the land as level as possible. Firming the soil was necessary. Mr. Stanton had farmed in a wet district where narrow lands had proved a failure. If the crabholes were connected by drains, narrow lands were not necessary. Deep ploughing should be avoided in this district. The Chairman said Mr. Wilson's scheme meant the use of fixed ploughs instead of the stump-jump. If he had crab-hole country he would use the skim plough, as better drainage would be secured.

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J. P. WILSON,

Minister of Agriculture.

POINTS FOR PRODUCERS.

The Department of Agriculture.

Several important changes have occurred in the *personnel* of the Department of Agriculture during the past month. Mr. W. L. Summers, who has been connected with the Agricultural Bureau since 1892, has been promoted to the position of Secretary to the Minister of Industry and Agriculture, which is that of a first class officer in the Civil Service. This will necessitate a severance of his direct connection with the Agricultural Bureau and its Branches, which he has served zealously for many years past as Secretary to the Advisory Board of Agriculture. Mr. Summers's record goes back to the days of the "Central Agricultural Bureau," established at the instance of the late Mr. Albert Molineux. When Mr. Molineux retired from the position of General Secretary of the Bureau in 1902 his work naturally devolved upon Mr. Summers, who was also appointed Inspector of Fertilisers under the first Fertilisers Act. The present Act dealing with the same subject was drafted according to his recommendations, and the same is true as regards the Chaff Act. In future the inspection of fertilisers will be carried out under the supervision of the Horticultural Branch. Mr. George G. Nicholls, hitherto bureau clerk and librarian, has been appointed Chief Clerk of the Department of Agriculture, and will succeed Mr. Summers as Secretary of the Advisory Board. Mr. P. H. Suter will be dissociated from the management of the Government Dairy Farm at Turretfield, and will devote all his time to the duties which more strictly appertain to his position as Dairy Expert. He will travel round among the butter factories, giving instruction and advice to the farmers in the direction of extending the work of the co-operative factories, enhancing the quality of the produce, encouraging the growth of forage crops, and improving the milk yields by selection, careful breeding, and judicious feeding. General regret will be felt that Mr. A. E. V. Richardson, M.A., B.Sc., is resigning his position as Assistant Director of Agriculture to take that of Agricultural Superintendent and Chief of the Division of Agriculture in Victoria. Since he became associated with the Department about three years ago Mr. Richardson has done a large amount of scientific work, and since he took up his residence at the Parafield Experimental Farm he has conducted experiments in the cross-breeding of wheats. He has contributed articles to the *Journal* on this and other subjects. Mr. Spencer Williams, Wool Expert, has resigned his position to undertake the management of the South Australian branch of the Federal Sheep-shearing Company. He will be succeeded by Mr. Henshaw Jackson, who has been appointed Instructor in Wool-classing at the Adelaide School of Mines.

Stock Diseases.

In this issue of the *Journal* we publish the first of a series of articles on the diseases of farm animals and their treatment, which will be furnished by the officers of the Stock Department. The articles will be continued in future numbers. The syllabus is as follows:—1. Introductory and anatomical. 2. General—Causes of disease. Symptoms. How to give medicines. How to make a *post-mortem* examination. 3. Ailments and diseases of the horse—Diseases of the digestive system. 4. Horse—Diseases of urinary, reproductive, and nervous systems. 5. Horse—Diseases of circulatory and respiratory systems. 6. Horse—General and contagious diseases. 7. Horse—Lameness, injuries, hereditary unsoundnesses. 8. Horse—Eye and foot troubles. 9. Cattle, sheep, and pigs—Diseases of digestive system. 10. Cattle, sheep, and pigs—Diseases of circulatory and respiratory systems. 11. Cattle, sheep, and pigs—Diseases of urinary, reproductive, and nervous systems. 12. Cattle, sheep, and pigs—Several contagious diseases. Interspersed there will also be articles on wounds, parasites, water supplies, poisonous plants, &c.

Encouraging Small Poultry-Breeders.

The Minister of Agriculture (Hon. J. P. Wilson) has granted £35 for special prizes to be competed for at the Royal Agricultural and Horticultural Society's Show in September, in order to encourage the production among blockers, small holders, and poultry-breeders generally of good specimens of the modern utility breeds. The scheme is intended rather to stimulate the novice than to benefit the experienced breeder, and no exhibitor or exhibit that has won a prize at any previous show will be allowed to compete. There will be prizes for White Leghorns, Wyandottes, ducks, boys' and girls' classes (utility light breeds), breeders' pens (five), light section, boys' or girls' breeders' pens, chickens, ducklings, table poultry, eggs, feathers, dish of mash, and also group prizes.

New Land for Settlement.

Surveying in the new hundreds is proceeding as fast as is possible under the circumstances. Altogether there are some three and a half million acres, more or less suitable for wheat-growing, which await survey in Eyre's Peninsula and in the Trans-Murray district. There are now three parties at work in the hundreds of Rudall and Smeaton, one near Arno Bay, three in the hundreds of Wilson and Vincent (Brown's Well Railway), and one in the hundreds of Wallis and Travers (Venus Bay). The repurchased land at Booborowie is now open for application.

Damp Courses.

One of the greatest troubles with Australian houses, both in town and country, is the rising of damp into the walls, whether they are of brick or stone, and probably this is due in most cases to the inferior material used as a damp course, with the result that it has been crushed out or perished. The following remarks, printed in an article on "Laborers' Cottages," appearing in the *Journal of the Board of Agriculture* (England), may be useful to some of our readers who are building homes for themselves :—"There are several materials in general use as damp-proof courses. Of these a double course of stout slates in cement 6in. above the level of the surrounding ground and laid to break joint is the one most commonly used, and is found to be very efficient. In certain districts, particularly in the Midlands, two courses of blue Staffordshire bricks in cement are used, and if the two courses of brickwork above and below them are set in cement mortar an equally satisfactory result is obtained. Asphalte, as generally understood, is a mixture of bitumen and tar, and is proof against damp rising, but it is liable to squeeze out under pressure of heavy buildings in very hot weather. There are certain makes of bitumen sheeting which prove effective for damp courses. *On no account should asphalted or tarred felt be used.* It is cheap, and is used largely in speculative work; but it is inefficient as a damp-proof course, and soon perishes. Its use should therefore be discouraged."

The Water Hyacinth.

South Australian landowners should be on the lookout that the water hyacinth (*Eichhornia* or *Pontederia crassipes*) does not obtain a hold on any of our creeks, lakes, or backwaters. According to an article in the June number of the *Agricultural Gazette of New South Wales* the plant is becoming more and more of a pest on the Clarence and Richmond Rivers and their tributaries, and has now established itself also, to some extent, on the Tweed and MacLeay Rivers. The water hyacinth has been innocently spread by people who admired the delicate lilac blossoms, and wished to beautify their creeks. At South Grafton, on the Clarence River, two plants were brought from Sydney 12 years ago, and they thrive so well that two years later they had taken complete possession of the creek, which at this place is 50yds. wide and 10ft. to 35ft. deep. The troubles which the hyacinth causes are numerous. On the St. John's River, Florida, it grew to such an extent as to stop navigation. As the old plants die, they accumulate at the bottom of the water, and in shallow watercourses or lagoons it is only a matter of a few years when they will be filled up with a dense mass of decomposing organic matter. The decaying plants give off offensive smells, the water becomes inky black and putrid, and stock will not touch it. The plant may be recognised by the curious bladder or bulbous development which grows at the base of the leafstalks and enables it to float on the water.

Paris Fat Stock Show.

At the annual show of fat stock held in Paris during February of this year the *prix d'honneur* for the best ox was awarded to a three-year-old Nivernais, weighing 20cwts. 1qr. 22lbs. The *prix d'honneur* for the best cow fell to a three-year-old Charolais, weighing 18cwts. 1qr. 24lbs. The Nivernais is a cross between the Charolais and Shorthorn breeds, pure white in color, and the finest breed in France for work and beef, but the cows are poor milkers. The *prix d'honneur* for "the best pen of three sheep of foreign breeds or crosses between foreign and French breeds" was secured by Southdowns, which weighed 4cwts. 3lbs. at 11 months. For French breeds of sheep the prize went to a pen of three Charmois, which weighed 3cwts. 2qrs. 11lbs. at 11 months. In pigs the *prix d'honneur* was awarded to a Craonnais, aged 12 months, and weighing 6cwts. 3qrs. 3lbs.

Imports and Exports of Fruits.

During the month of June 9,521bush. of fresh fruits, 297 bags of onions, 1,159 bags of potatoes, and 92pkgs. of plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 106bush. of bananas (chiefly over-ripe) were destroyed, 10bush. of passion fruits, and 523 bags of potatoes were rejected for non-compliance with regulations and on account of disease respectively. The exports to inter-State markets examined and passed at Adelaide and Port Adelaide comprised 3,923bush. of fresh fruits, 3,574pkgs. of vegetables, 74pkgs. of plants, and 311 bags of potatoes. In addition 73bush. to fresh fruits were certified for export at Gawler, 5,843 bags of potatoes at Mount Gambier and Rendelsham, 225bush. of fresh fruits at Wirrabara, 39bush. fresh fruit at Stirling West, and 454bush. of fresh fruits at Clare; 275bush. fresh fruits were also passed by Murray Valley inspectors. Under the Federal Commerce Act 2,119 cases of fresh fruit, 86pkgs. of preserved fruit, 2,853pkgs. of dried fruit, 52pkgs. honey, and 5pkgs. plants were exported to oversea markets during the same period. These were distributed as follows:—For India and East, 751 cases apples, 63 cases of citrus fruits, 66pkgs. preserved fruit, and 2 cases honey; for London, 360 cases apples and 339pkgs. dried fruit; for New Zealand, 945 cases citrus fruits, 2,314pkgs. dried fruit, 20pkgs. preserved fruit and 7pkgs. plants; for South Africa, 200pkgs. dried fruit; for Germany, 50 cases honey. Under the Federal Quarantine Act 982pkgs. plants, seeds, bulbs, &c., were admitted from oversea sources.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. Enquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

ALMOND-GROWING.

"J. A.," Wasleys, writes—"I am contemplating planting several acres with almond trees, and would like to know, say, three of the best kinds, the distance apart to plant, time to plant, and any other information available. Also, I would like your opinion of the Jordan almond."

The Horticultural Instructor (Mr. G. Quinn) replies—"The almond requires a well-drained soil, preferably rich in sand and lime. To fruit well the climate must be mild, more especially in the early spring season, as the tree blooms very early. Grown as a double or triple rowed shelter around a boundary fence the trees may be placed 12ft. apart, but in an open plantation 20ft. to 24ft. apart would be more suitable distances. The best tall-growing sorts grown here are Brandis and Peerless; the spreading kinds, White Nonpareil and Hatch's Nonpareil. There are other good sorts, one known as Jose's Seedling being of local production. The Jordan is a hardshell, and I cannot supply any information of a definite nature respecting its productivity under our local conditions."

POLISHING APPLES.

"Longwood" asks for an opinion as to whether apples for dessert or export should be polished.

The Horticultural Instructor (Mr. G. Quinn) replies—"It is generally agreed that the natural bloom should not be rubbed off apples if intended for export or show purposes. In cases where the fruit is disfigured by adhering spray-wash or fumagine due to the excretions from insects, it certainly is desirable to cleanse them, but not where the fruit is free from such blemishes."

DRYING-OFF COWS.

"Longwood" asks—"What is the best way to dry-off cows?"

The Dairy Expert (Mr. P. H. Suter) replies—"The best method to adopt is to cease giving the cow milk-making foods such as bran, green fodders, &c., leaving a little milk in the udder after each milking, only milking once daily

for the first week, then once every second day the next week, and once every three days the following week, when the cow should be dry; if not, then probably one more milking will usually suffice. Thus it will be seen that the cow is not stripped clean out, and that the period between the milkings is lengthened."

FEEDING VALUE OF OATS AND BRAN.

"F. W. G.," Parrakie, asks—"Are dry oats equal in food value to bran for milking cows?"

Answer—At present figures the price is somewhat in favor of oats, but they should be crushed for the best results with cows. The percentage of dry matter digestible in 100lbs. of the respective feeding stuffs is as follows:—Oats, 62 per cent. to 63 per cent.; bran, 54 per cent. to 55 per cent. Of course it will be known that the quality of oats varies much more than the quality of bran, and it may be taken that, with fair quality oats, the feeding value is a little more than the feeding value of bran weight for weight.

AMOUNT OF MOISTURE REQUIRED BY DECIDUOUS TREES.

"Waikerie" writes—"What amount of moisture do deciduous trees and vines require in their dormant state?"

The Horticultural Instructor (Mr. G. Quinn) replies—"The exact percentage of moisture necessary in the soil to prevent injury to trees and vines through loss of the water of organisation during the dormant season cannot be stated. There must, however, be sufficient to make up for the evaporation which takes place from the bark of roots and tops during the winter. The question of keeping the soil temperature within a suitable range to permit the plant resting is also bound up with the question of moisture in it. In practice the volume of moisture which permits its presence to be readily noted by the ordinary senses of light and touch has proved sufficient."

USE OF SULPHATE OF POTASH ON WHEAT CROPS.

"H. D. K., Lameroo," writes—"Having read that sulphate of potash is used for increasing the wheat yield, I would like to know the best way to apply it—whether to mix it with the super. or apply it as a top-dressing?"

The Director of Agriculture (Professor W. Lowrie, M.A., B.Sc.) replies—"I prefer applying the super. in the usual way, and top-dressing with the sulphate of potash after the wheat has germinated. It can be applied by mixing the super. and the potash, but it has to be applied immediately after mixing, as the potash salt draws moisture. If you are applying a fair dressing of sulphate of potash it is just as well that it shall not come into contact with the seed, as it sometimes affects germination, where there is not much moisture in the ground. It should therefore be applied broadcast on the land before the seed is sown, or top-dressed after the crop is up. I should like to know later whether you get any beneficial result following the

application of sulphate of potash. I have had no evidence yet, on new country at any rate, that it is of much immediate benefit for wheat."

USE OF SUPER. BAGS FOR HORSE FEED.

"F. W. G.," Parrakie, writes—"Will you please advise me of a recipe for the treatment of super. bags, so that they may be used for holding horse feed."

The Inspector of Fertilisers replies that if the bags are first rinsed in clean water and then, while wet, thoroughly rinsed in a solution of 1oz. washing soda to a gallon of water, it is most probable that any acids will be neutralised. At the same time, however, it is very doubtful whether the bags are worth treating in this way.

PROPAGATING PITTOSPORUM SEEDS.

"On the River" writes—"I would like to know how to treat pittosporum seeds—how to sow the seed and to raise the young plants."

Reply—A leading seedsman says the seeds of pittosporum should be sown thickly immediately after the pods are broken up. They should be sown in boxes of loose earth and covered lightly with sandy soil. He says the seeds germinate sparingly during the first season, but the earth should not be thrown away as during the second season others will come up. Place the boxes in a fairly shaded spot and water freely in the dry summer weather.

HARD WHEATS.

"R. C.," Port Broughton, asks—"Is Medeah wheat a milling wheat, and will merchants buy it at the same figure as they buy other wheats?"

The Director of Agriculture (Professor Lowrie) replies—"Medeah is a durum or hard wheat, and is used chiefly for milling flour for macaroni. I do not think merchants here would buy it at the same figure as they buy soft white wheats, unless it were grown in quantity, when they could place it on the Mediterranean."

CHOU MOELLIER.

"Meadows" writes—"Could you please let me know the price per pound of Chou Moellier (cattle fodder) seed, where to obtain same, and particulars re cultivation of same?"

The Director of Agriculture (Professor W. Lowrie, M.A.) replies—"The price is determined by the fact that there is not much grown here. Local seedsman quote 5s. per pound. The cultivation of it is practically the same as that of Thousand-headed kale. It can be drilled in straight in rows 28in. apart, or thereabouts; 2lbs. of seed per acre if the plants are to be thinned out; if not, 14ozs. of seed should be ample. Another way of planting small areas is to sow in a seed bed and transplant the seedlings, as is done in the case of cabbages and similar plants."

DISEASES OF FARM ANIMALS.

THEIR CAUSE AND CURE.

BY THE OFFICERS OF THE STOCK DEPARTMENT.

No. 1.—INTRODUCTORY AND ANATOMICAL.

In new countries with widely-scattered areas it is absolutely essential that the settlers should have some knowledge of the ailments and diseases which are likely to attack their stock.

Judging from the large number of correspondents who evince a desire for knowledge in matters relating to disease, it appears that in the majority of districts the farmers are thrown on their own resources, and in cases of sickness amongst their stock have to rely on their mother wit, trained or untrained. This is an age when laymen are being taught the language of science. Of course a farmer does not need to be a veterinary surgeon, but knowledge is easy to carry; and though we can hardly hope that the day will come when every farmer will be a graduate of a college, yet it is quite possible for a large number of our farmers and stockowners to study the rudimentary principles of veterinary science. Unfortunately the farmers are greatly handicapped in their efforts to learn, owing to the fact that the scientist speaks in a language unknown to them. It is necessary that the scientist and the farmer should meet half-way, the former not only recording the results of his investigations in scientific language, but also in the language of the layman; and the latter should acquire as much as practicable of the technical language of science.

All efficient measures for the preservation of health rest upon an exact knowledge of the natural courses of disease. It has been stated that progressive practice in the study of disease is not possible without a thorough knowledge of anatomy and physiology. How far, therefore, must the farmers and stockowners be initiated into anatomical and physiological science? Their knowledge should be sufficient to enable them to know the common names and principal functions of the organs of the chief systems—digestive, respiratory, circulatory, urinary, and reproductive.

The following comparative table will give at glance the names and characters of the chief organs :—

Organs.	Horse.	Cattle, &c.	Pig.

Digestive System.

Mouth ; lips	Thin, movable	Thick. (Sheep thin, upper divided)	Upper thick (snout) : gristly
Teeth.....	40 (36 and no tusks in mare) ; six grinders in each jaw	32 ; none in front of upper jaw ; eight loose, below ; six grinders in each jaw, sharper than horse's	44 ; tusks well developed ; seven grinders in each jaw for tearing and crushing
Tongue	Round at tip, soft	Pointed, rough. (Sheep thin)	Thin
Stomach ..	Single bag, holding about 3galls.	Very large, in four parts: 1, paunch, 9-10ths of whole, holding 50-60galls. ; 2, honey-comb ; 3, many leaves, or bible ; 4, true stomach	Single bag, holding 1½galls.
Small bowels	24yds. x 1½in. diam.	50yds. x ¾in.	56ft.
Water gut (caecum)	Conical bag, 3ft. long, holding 7½galls.	Round, like polony skin	Like a big pear
Large gut (colon)	Folded in four parts ; two large, two small, 10-13ft., 10ft. holding 18galls.	Coiled round ; 30-40ft., 18galls.	Coiled, 16ft.
Liver	Three lobes ; no gall bladder; weight 11lbs.	Gall bladder ; rounded edges	Gall bladder ; three well-marked lobes
Spleen (Milt)	Reddish-grey ; sickle-shaped, weight 32ozs.	Long, with round ends on left of paunch	Long, thin

Circulatory System.

Heart.....	Conical, 10-11in. long, weight 6½lbs., not much fat	Shorter, weight 4lbs., two small bones inside. (Sheep, weight 6ozs.)	Like horse, but thin.
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Respiratory System.

Nostrils ...	Thin edges, large	Thick, small. (In sheep, thin)	In front of snout
Lungs	Large, long ; right a little larger	Short, conical ; left with two lobes, right four	Like cattle

Urinary System.

Kidneys ...	Flat, smooth ; right like ace of hearts, 27ozs. ; left bean-shaped, 25ozs.	Long, lobed. (In sheep, smooth bean-like)	Longish, flat, light-brown
Bladder ...	Thick-walled, 16ozs.	Thin, large	Thin

Reproductive System.

Organs.	Horse.	Cattle, &c.	Pig.
Testicles ...	Roundish	Oval, large	Round, under vent
Penis	Trumpet-like	Pointed, with S-curve half way up	Pointed, large thick sheath
Ovaries	Like small testicles, near loins	Similar	Lobed
Womb	Two horns point down.	Two horns point up	Horns long and floating
Udder	Two halves, several openings in each teat	Four quarters, reser- voir in each, one opening in each teat. (Sheep, two halves)	10 teats along belly; several openings into each teat

WORK OF THE ORGANS.

In the digestive system the thin, movable lips of the horse and sheep pick up their food, which in the horse is cut off by the shear-like incisor teeth ; in the sheep and ox by the cutting teeth acting against the gristly pad on the top, and in the pig by chiselling off pieces spooned up by the lips ; then, in all of them, the food is rolled about and tasted by the tongue, ground by the back teeth, rolled again by the cheeks and partly digested by the saliva or spittle so that it can be swallowed. In the horse it goes into the single stomach and is mixed in the first half, which is whitish, and further digested in the pink half ; the same occurs in the pig, but as his food is mixed the stomach works more actively. In the ox and sheep the food goes first into the paunch and is rolled about, softened, and returned to be chewed as cud, going down into the paunch again, passing through the honeycomb, being squeezed dry in the many leaves, and much of it digested in the fourth or real stomach. In the horse, water passes through the stomach and small bowels to the blind or water bowel, so that he should be watered before feeding to prevent undigested food being washed through, while in the ruminants the water goes into the paunch first. The partly digested food passes in all into the small bowels, where it meets the bile from the liver, and other juices which make it fit for the blood-vessels to take up most of the nourishment, while the less digestible and waste parts pass on to the large bowel, where they give up the rest of their goodness, and the waste is passed out at the vent.

The circulation is carried on by means of the heart and blood-vessels. The larger half of the heart pumps the red blood through the arteries all over the body, and so nourishes the various organs ; the used-up blood becomes dark and is returned by the veins from all parts to the smaller half of the heart, which pumps it into the lungs, where, spread out over an enormous surface, it comes in contact with the air and, cleaned and refreshed, returns to the heart to be circulated again.

Breathing is carried on by all animals through their nose. The nostrils of the horse are wide and let in large quantities of air when at fast work, while the ruminants and lazy pig require less. The air, warmed through the nose, passes down the windpipe, which gives off a branch to each lung, in which fresh oxygen is given to the blood, and the used-up air, containing carbonic acid, is received from the blood and breathed out as the chest sinks together.

Liquid waste is carried by the blood to the kidneys, which filter it off, constantly passing the urine into the bladder, where it is held till a convenient occasion to void it. There are other filters in the body, called glands, which help with this work.

Reproduction is carried on by the meeting of the male and female elements in the body of the female at a special season when the egg cell is passed from the ovary into the womb, the animal being said to be in season or heat. After fertilisation the young grows in the dam's womb for a fixed period, when it is brought forth alive and able to draw its nourishment from the dam's teats until strong enough to eat.

DIAGNOSIS AND TREATMENT.

The art of curing animals, and to this may be added the art of prevention, has all the characters of an art. It is dependent on experience and skill; it deals with individual cases, and the perfection it aims at is practical, not speculative—the knowledge how to do something. Some cases of sickness are easy to diagnose, some are hard. To be able to observe and diagnose with benefit to themselves stockowners must acquire a certain amount of skill, especially in the use of their hands, and this can only be obtained by repeated efforts and much perseverance. The two chief factors in the formation of a correct diagnosis are the patient and the doctor.

The farm animals cannot speak and tell us where the pain is. They are of different temperaments, and may exhibit the symptoms of a disease or ailment in varying ways. We get very little help from our patients towards a diagnosis, and before a conclusion is arrived at a careful weighing and balancing is necessary.

Some men are naturally gifted in the diagnosis of stock ailments—they are able to judge futurity, which is an excellent passport to success; but experience will teach many that the best way of demonstrating a correct diagnosis is by *post-mortem* examination, and frequently the *post-mortem* examination will be very surprising, and perhaps will not corroborate the diagnosis made during life; and this naturally leads us to say a word regarding the treatment of sick animals. No golden rule has been laid down, but our main object should be to assist the animal to overcome the ailment by

good nursing and common-sense treatment, and guard against complications; and in the nursing and treatment of sick animals two great factors are patience and kindness.

We must not treat our patients by rule of thumb. The treatment of symptoms without a diagnosis is always unsatisfactory; but once an observant farmer has seen and understood a case of sickness in an animal he will probably recognise all similar cases in future. There must not exist in the minds of farmers an implicit belief in drugs. The indiscriminate use of drugs is to be deprecated. Sick animals, like sick persons, are often crying out for advice and not medicine.

The beneficial effects of pure air, food, and water, suitable environments, and good nursing should receive more attention.

(To be continued.)



'Blue Ribbon of Turretfield.

IMPROVING OUR DRAUGHT STOCK.

HORSE-BREEDING SOCIETIES.

A NEW SCHEME.

The Government have decided, on the recommendation of the Director of Agriculture (Mr. W. Lowrie, M.A., B.Sc.), to assist in instituting a scheme for encouraging farmers and others to improve the breed of draught horses, by establishing horse-breeding societies throughout the State on somewhat similar lines to those of the horse-breeding clubs of Scotland. The text of the Director's report is as follows :—

“ For some years there has been throughout Australia a keen demand for good draught horses, created by the energetic policy of the different Governments in opening up new agricultural areas, and the extension of farming, the result of subdivision of large estates repurchased. The prices of draught horses have accordingly ruled high. Breeders who have been able to take advantage of the opportunity have been making good profits, but, unfortunately, South Australian farmers have been unable to take full advantage of the opportunity. I notice, for example, in the official year-book for 1909, that South Australia imported in that year 3,517 horses of all breeds, valued at £96,673, and exported 1,321, valued at £44,438—a difference in favor of imports of 2,196 horses, valued at £52,235, and so far as I am aware the position has not been improved. I know from my own observation that only a small proportion of the large shipments of horses to Western Australia at highly profitable figures came from South Australia. As there is no question that the State is admirably adapted for horse-breeding, something is wanting which should be remedied or made good, so that an adequate share in the draught horse transactions of the Commonwealth may be secured. It is not to the credit of the farmers and breeders that over £50,000 in any one year should represent the difference in values against us between import and export of horses.

IMPROVEMENT MUCH TO BE DESIRED.

“ The balance, indeed, it may be argued, should be the other way—that we should at least export that value more than we import, especially in view of the prices of draught stock ruling and the profits accruing to successful breeders. We have to confess, however, that our draught horses do not

compare in general average quality with the horses in New Zealand or even in Victoria, and there is good reason to urge that an improvement in quality is much to be desired as well as an increase in the numbers bred. Too large a proportion of the farmers now breeding a few foals a year, through carelessness or ignorance use poor-quality draught sires, mongrel roadsters, or weedy thoroughbreds, because they can hire the service cheaply, failing to realise what will be the difference in value at three years old, given care and judgment in rearing, between the colt by a good typical sire and that by a mongrel. The breeder's axiom—the best pay best—is overlooked. The proposed courses of lectures by veterinary surgeons, among other benefits, will, I think, help to awaken an appreciation of the importance and profits accruing from the use of first-class sires. At the same time, there is good evidence that many farmers are alive to the fact that a lower fee in most instances proves in the end the more expensive service, and they would be prepared to pay higher fees for the service of a really good typical Clydesdale horse, provided such horse travelled the district. As things are, however, they have perforce to fall back on the best available with great reluctance.

SUPPLY OF GOOD SIRES.

“ These men, it may be confidently anticipated, would join the ranks of the breeders of really good horses in convincing numbers if first-class sires came within their reach. Accordingly, I suggest that something be done to bring about a better supply of good sires. I propose that there should be formed, from among the farmers of the State, horse-breeding societies with functions similar to those of the horse-breeding clubs in Scotland, which have been so successful in improving the quality of draught stock of that country within this generation. The nuclei of these societies may be the Agricultural Bureau, the horse committee of agricultural societies, or simply a committee of farmers of any district who may agree to beat up members towards the formation of a horse-breeding society for the district. I suggest, if such societies be formed, and can collect from their members—confined, of course, to a district reasonably practicable for a stallion to travel for the season—a sum of money towards a premium to secure the service of a suitable horse, that the Government should subsidise that sum £2 per £1 collected on a basis of definite conditions somewhat as follows :—

(a) That the minimum subscription for membership of a horse-breeding society formed with a view to claiming a subsidy from the fund allotted be one guinea.

(b) That the minimum number of members who shall constitute such society be 20, and that only farmers or owners of one or more brood mare or mares to be used for breeding be eligible for membership.

(c) That the horse-breeding society be duly constituted at a meeting held for the purpose, and a chairman, secretary, and two members of committee be appointed by the members.

(d) That the minimum sum on which a £2 per £1 subsidy will be paid from the fund be 60 guineas, and the maximum sum 100 guineas.

(e) That before the subsidy can be claimed, at least 60 mares shall have been nominated. The nominators shall have paid to the secretary of the society a fee of two guineas a mare.

nominated, and the secretary shall have deposited the amount in the Savings Bank to the credit of the society, together with the sum subscribed by members. Further, that the subsidy may be payable, the society shall conform to these conditions:—

1. That, when the claim for a subsidy has been approved, the society shall appoint two or more of its members to select a horse for the district.
2. That the fees to be offered shall be one guinea a mare served, payable at the close of the season, and a further sum for each foal left by the horse, the amount to be determined as follows:—When the amount of the subsidy does not exceed £150 the fees per foal left shall be four guineas; when the subsidy is over £150, and does not exceed £180, the fees per foal shall be five guineas; and when the subsidy is over £180, six guineas per foal left by the horse shall be offered.
3. That any horse eligible to earn the premium shall be four years or over; shall have been certified sound by a Government veterinary surgeon; shall have a satisfactory pedigree; and shall have been passed as a horse of quality and breeding worthy of such premium.
4. That the number of mares to be put to the horse selected shall not exceed 70, and it shall be agreed with the owner of the horse to limit that horse altogether to the mares nominated by the society for the season, which shall extend to three calendar months. In the event of more than 70 mares being nominated, the chairman and members of committee of the society shall decide the nominations to be accepted, or may delegate the culling to a Government veterinary surgeon. The nomination fees of the mare rejected shall be refunded to the owner.
5. That the owner of the horse selected shall have agreed to travel that horse in the district for the season following an itinerary satisfactory to the society, and to pay all expenses, groom, feed, &c., in connection with the stallion.

(f) The society may retain 10 per cent. of the total of the sums subscribed, the subsidy accruing, and the nomination fees, to cover expenses of the secretary and of the committee appointed to select the stallion for the society. If no expenses be incurred, that percentage may be credited to the following year's subscription, on which a subsidy is to be claimed.

(g) That if there be a credit balance, after paying the owner of the horse in accordance with the agreement as above, 40 per cent. of that balance shall be repaid to the Government Horse-breeding Subsidy Fund.

(h) If a horse happen to leave an abnormally high percentage of foals, and the funds of the society be insufficient to pay the owner the agreed fees, the amount required shall be made up from the fund devoted by the Government for the purpose of subsidies.

(i) That the subsidy claimed in accordance with these regulations shall be payable on the 1st day of August following the season for which it was approved.

“I believe that if a scheme can be introduced on the lines foreshadowed and farmers can be persuaded of the advantages to be gained by forming such societies that horse-breeding will be stimulated in a marked degree, and the quality of our draught stock improved as successive generations of mares come to the stud. I have not suggested that the fees to be paid by the owners of mares should be much reduced; rather have I endeavored that the subsidy shall be made the means of increasing inducements to breeders in the State to introduce first-class sires from Scotland or New Zealand by augmenting the fees to be earned by a good horse. If the scheme were in working I would further expect that breeders in the other States might be encouraged to send really good stallions here for the season. I think it likely also that as enthusiasm and the spirit of emulation among the societies grew, as has occurred in Scotland, that some of them, when they failed to secure for the premium they could offer horses of the desired breeding and quality in this State, would be enterprising enough to send delegates to the eastern States or to New Zealand to secure horses up to their aim for the season.

USING THE TOTALIZATOR PERCENTAGE:

"It would be well if it could be arranged that the Royal Agricultural Society should hold annually a parade of stallions immediately before the season began in Adelaide, where delegates from the various societies could attend to inspect and select horses for the forthcoming season as the best terms they had to offer in conformity with their subscription could command. I suggest that the revenue from the totalizator percentage paid to the Government be the fund from which subsidies shall be payable in furtherance of this scheme. The totalizator percentage last year, I understand, amounted to £10,000, and £12,000 is likely to be the sum received this year. If half of that money could be earmarked as available it would provide ample funds. I do not expect that there will be more than, say, 10 societies formed right away, and if each of these puts up the maximum subscription the subsidy payable would be £2,100; but even if 25 societies were formed half the totalizator moneys would amply suffice to finance the scheme. Certainly it would be a forward movement, pregnant of much benefit to horse-breeding, if even 10 such societies would be organised and efficiently conducted.

A CONCRETE INSTANCE.

"Under the conditions proposed it is not likely that the percentage of foals left will absorb the whole of the premium, and under the rule that 40 per cent. of the balance be repaid to the fund the sum required for the 10 societies will be under £2,000. I will give a concrete instance, and take the case of a society putting up the maximum—100 guineas. The figures will be as follows:—Society's subscription, £105; subsidy, £210; nomination fees for 70 mares at £2 2s., £147; total, £462, less 10 per cent. for expenses, £46 4s.; total balance, £415 16s. 8d. The charges against this sum may be somewhat as follows:—Service fees for 70 mares at £1 1s., £73 10s.; say 37 foals at £6 6s., £233 2s.; total £306 12s. Thus a balance of £109 4s. would remain in favor of the society, and of this amount 40 per cent. would be repaid to the Government fund, viz., £43 13s. 6d. On this average, therefore, the amount of subsidy expended for the year for 10 societies would be under £1,700. The larger amount of the subsidy to each society is necessary, that there may be funds enough to meet the case if the society had the good fortune to secure a horse leaving an exceptionally high percentage of foals. I have made it a compulsory condition that the fee, two guineas, to be paid by members per mare nominated shall have been paid to the society and deposited in the Savings Bank before the subsidy can be claimed or the amount of premium to be offered can be reckoned, in order that bad debts may be altogether avoided. A list would be published annually in the *Journal of Agriculture*, setting out the number of foals left by each premium horse."

OUR FEATHERED FRIENDS.

PROTECTED NATIVE BIRDS.

(Continued from page 1042.)

ROYAL SPOONBILL.

SCIENTIFIC NAME: *Platalea regia* (Latin), the royal spoonbill.

SIZE.—About that of a crane, and when standing erect about 20in. to 2ft. high.

BILL.—Its bill, which is long, black, and spoon-shaped at the end, is the most striking feature, and renders the bird easily recognisable.

LEGS.—Long and black, and well suited to a bird of wading habits.

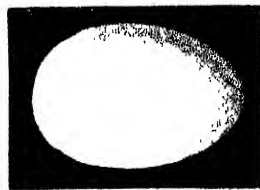
PLUMAGE.—All white. At the back of the head is a crest of fine white feathers, that can be erected and spread out in all directions at will.

HABITAT. - Along the margins of lagoons, rivers, and in swamps.

FOOD.—Chiefly frogs, tadpoles, fish, and aquatic insects.

NEST.—The spoonbill builds its flat nest by breaking down the reeds that grow along the margin of fresh-water areas. Sometimes a few twigs are placed upon this platform of reeds. The nesting season lasts from October until January.

EGGS.—Three to five, measuring about 2½in. x 1½in. They are colored dull white, and splashed with reddish-brown near the broad end.



HALF SIZE.



CURTIS DEPT. AGRICULTURE & FORESTRY, PHOT. 50

STRAW-NECKED IBIS
Geronticus spinicollis;
About one-sixth life-size



HALF SIZE.



ROYAL SPOONBILL
Platola regia;
About one-eighth life-size

STRAW-NECKED IBIS.

SCIENTIFIC NAME : *Geronticus spinicollis*.—*Gerontikos* (Greek), like an old man, in allusion to the bald head and neck ; *spinicollis* (Latin), spiny-necked, referring to the thin, spine-like feathers on the lower neck.

SIZE.—The ibis measures about 28in. from beak to tail. Its long, stilt-like legs and large curved bill add to its appearance, and make it quite an imposing bird.

BILL.—Long and curved. It is black, with the exception of a few yellowish bars that cross it transversely near the base.

FEET AND LEGS.—The upper part of the leg is crimson, and the lower portion, together with the feet, dirty brown.

PLUMAGE.—The head and upper neck of the mature bird are bare of feathers and colored black. The back and sides of the neck are covered with whitish down. The back and wings are of a glossy bronze-green with a purple sheen. The wings are crossed with several bars of black. The breast, which is colored like the back, is adorned with a plume of long, thin, straw-colored feathers, that depend from the lower neck.

HABITAT.—The favorite haunts of the ibis are shallow swamps and lagoons. They may be seen feeding on the flat ground in the neighborhood of water areas, especially at that time of the year when grasshoppers are numerous.

FOOD.—This useful bird feeds chiefly on frogs, aquatic insects, and fresh-water molluscs. It is especially useful in destroying fresh-water snails, in which the dreaded sheep fluke spends one phase of its existence. As a destroyer of grasshoppers it has, perhaps, no equal among our birds. One ibis was found to have devoured 2,410 grasshoppers, five fresh-water snails, and several caterpillars in a single day.

NEST.—The ibis makes a nest of flags and reeds on the margin of a lagoon or other fresh-water area. Sometimes a few twigs are added in its construction. Nesting takes place from September to December.

EGGS.—The eggs number three to five, and are white. An average-sized egg measures about $2\frac{1}{2}$ in. \times $1\frac{1}{2}$ in.

AUSTRALIAN BITTERN, OR BOOMER.

SCIENTIFIC NAME: *Botaurus australis*.—*Botaurus* (Latin), the bittern; *australis*, of the Southern Hemisphere.

SIZE.—In size this bird resembles the crane.

BILL.—Long, pointed, and of a yellow color. The skin around the eyes is yellow, with sometimes a tinge of green.

PLUMAGE.—The plumage is mottled brown and buff. The back is dark mottled brown, but the wings and sides are slightly lighter in color. The breast and neck are lighter still. A most marked and characteristic feature is the crest of long feathers which grows over the back of the head and neck, and can be raised at will.

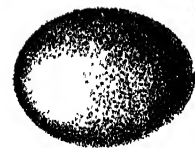
HABITAT.—The bittern haunts the margins of lakes, lagoons, swamps, and rivers.

FOOD.—It feeds principally upon small fresh-water fish, frogs, and aquatic insects.

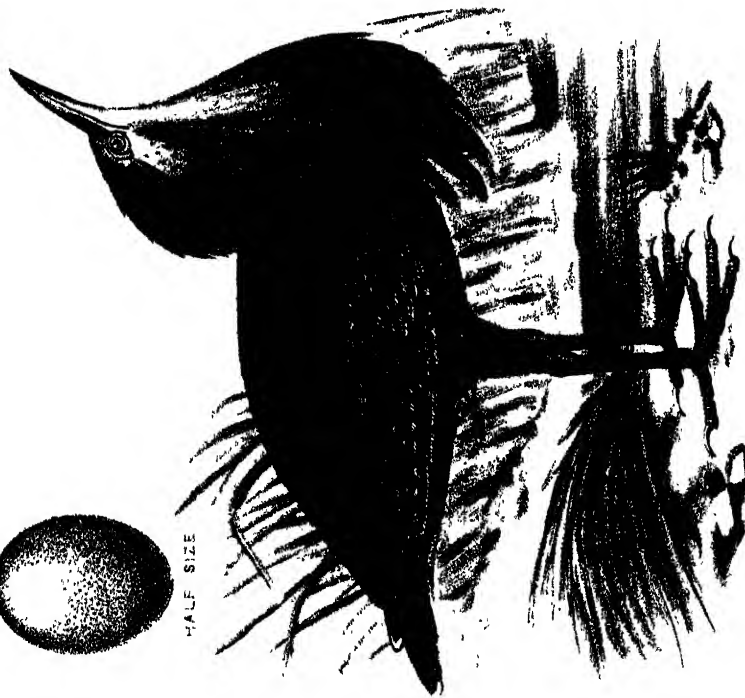
NEST.—The bittern nests along the margin of a lake or lagoon, usually among the reeds. The nest is constructed out of the flag and other soft parts of reeds, and forms a platform about 6in. above water level. Nidification takes place from November to January.

EGGS.—The eggs number four to five in a clutch. They are light or pale olive in color, and measure about 2in. x 1½in.

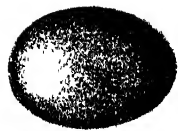
Note.—The bittern is called "the boomer" on account of the booming noise it makes at night time. When booming it points its bill upward, and repeats its low note three or four times in succession. If attacked, the bittern draws back its head and shoots forward its long bill with great force and rapidity, aiming at its antagonist's eyes.



HALF SIZE



AUSTRALIAN ETERN
BONNET WASP
About one year life-size



HALF SIZE



WHITE-THROATED HERON OR BLUE CRANE
Ardea more hol/und.
About one-sixth life-size

WHITE-FRONTED HERON, OR BLUE CRANE.

SCIENTIFIC NAME. *Ardea Nova Hollandiae*—*Ardea* (Latin), the heron, *Nova Hollandiae* (Latin), of New Holland, the old name for Australia.

SIZE.—When standing erect this bird measures about 24in. in height. It is about the size of the bittern, but looks sleeker and more graceful.

BILL.—Long and pointed. The skin about the eyes is slate or lead colored.

PLUMAGE.—The general appearance is of a bluish slaty grey color. The feathers on the face and throat are white. The back and wings are bluish slaty grey. The breast is grey, tinged with rusty brown. The feathers on the back and chest are long and pointed, somewhat after the manner of the hackle of a rooster.

FOOD.—The heron feeds almost exclusively upon fish, crayfish, frogs, and other small water animals.

HABITAT.—Lagoons, lakes, marshes, rivers and river estuaries.

NEST.—The heron nests during the months of October, November, and December. It builds a nest of sticks lined with leaves in the fork of a tree that grows near the swamp.

EGGS.—The eggs, which usually number four, are of a pale bluish green color, about 1½in. x 1¼in.

MARSH TERN.

SCIENTIFIC NAME: *Hydrochelidon fluviatilis*.—*Hydrochelidon*, from the Greek *hydor*, water, and *khelidon*, a swallow; *fluviatilis* (Latin), living near rivers.

SIZE.—The body is about the size of that of a dove, but the long tail, together with the long, pointed wings, make it look much larger. From beak to the tip of the tail it is about 10in. to 12in. in length.

BILL.—Blood red in color.

LEGS AND FEET.—Blood red.

PLUMAGE.—The forehead, top, and back of the head are black. The back, wings, and chest are a light slaty grey. The sides of the head, chin, and throat whitish. Under the wings and tail the feathers are white. The wings are long, curved, and pointed, and admirably adapted for swift flying.

HABITAT.—Fresh-water lakes, lagoons, swamps, and marshes. It is mostly seen flying or hawking over the water, after the manner of the seagull.

FOOD.—Aquatic insects, tadpoles, frogs, and small fish.

NEST.—The nest is built of stalks of aquatic herbage, with a submerged foundation, and fringed about with growing grass (couch) in a lagoon or swamp. "Dimensions over all, including foundation under water, 18in. in depth, diameter of base at waterline 16in. to 18in., diameter of the top, which is slightly concave, 8in."—*Campbell*. Nidification takes place from October to December.

EGGS.—The eggs usually number two, although it is no uncommon sight to see three in a nest. They are of a greyish-green color, strongly spotted with dark brown and dull grey. The average size is about $1\frac{1}{2}$ in. x $1\frac{1}{10}$ in.



NAT. SIZE

MARSH TERN
Hydrochelidon fluvialis
About one-third life-size

ROSEWORTHY AGRICULTURAL COLLEGE.

Fourth Report on the Permanent Experiment Field, Seasons 1909-10
and 1910-11.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College,
and W. J. SPAFFORD, Assistant Experimentalist.

(Continued from page 1037.)

THE LOCAL FINANCIAL ASPECT OF ROTATION.

We now approach, with some diffidence, a more difficult aspect of rotation, viz., the extent to which its cash returns compare favorably or otherwise with those of wheat grown continually in alternation with bare fallow. Even under the most favorable of conditions, estimates such as we propose making are always open to more or less justifiable criticism. Prices of commodities, for instance, fluctuate to such a degree that it is never easy to base one's arguments on prices acceptable to all. The task is relatively simple and straightforward so long as the commodities dealt with are represented by staple produce, having well-known market prices, as is the case with wheat, barley, hay, wool, &c. It is quite otherwise when one is confronted with the task of estimating the money value of a crop that is fed down by sheep. It is true that in countries in which these crops have been handled for numbers of generations they end by acquiring certain well-known local values. It is thus that Professor Lowrie has been good enough to inform us that in Scotland a hogget is reckoned at 4½d. a week in a field of turnips. When, however, a crop is introduced tentatively into a district no such common basis of understanding can possibly exist, and we are necessarily driven to more circuitous methods to arrive at anything like its money value.

In this connection we have had under consideration various schemes that might help us to a just monetary estimate of the value of a grazed crop. We had at first thought that the increase in weight, realised during grazing operations, might yield a fair basis for our calculations. Thus, for example, if on a field of turnips a flock of sheep should increase in live weight to the

extent of 480lbs. to the acre, this increase might be taken to be equivalent to the value of four average Merino wethers, i.e., about 48s. Such a basis of calculations, however, would have implied that we should have had constantly on hand a sufficiently large number of store wethers amenable to the grazing of relatively small acres; experience has shown us that this is not practicable on a farm on which breeding ewes form the great bulk of the flock.

Ultimately, we have adopted another method of calculation which, whilst it gets over the difficulty referred to, will always remain open to the criticism that whatever valuation is adopted must vary considerably with local prices and conditions. We have taken the number of sheep grazing on a given area for a given period of time, and reduced them to sheep per acre per annum; we have then reckoned the money value of the crop to be represented by the gross returns per annum from an equal number of ewes. Evidently, the greatest difficulty will consist in arriving at a satisfactory estimate as to what would fairly represent the average gross returns of a farm ewe. The factors affecting this average are, no doubt, very numerous; there is the season, the type of ewe, the district, prevailing prices, selling ability, &c., all tending more or less to influence average returns. We have adopted as our figure, 15s. a ewe, which is, on the whole, below our own actual returns and not, in our opinion, in excess of what is within reasonable reach of every farmer similarly situated. Thus, then, if an acre of turnips carry 73 sheep for 15 days this should represent three sheep per acre per annum, or an approximate value of 45s. As we shall be careful to supply all details connected with our various calculations it will be open to those who do not agree with our results to draw up their calculations on whatever basis they may please.

Finally, before coming to details, it is right to state that there is good reason why, in this special connection, our estimates and conclusions can have no more than a purely tentative value; and this because they rest very largely on data that are as yet insufficiently comprehensive to render generalisation altogether safe. And, further, whilst we believe ourselves to be thoroughly familiar with the handling and growing of local wheat crops, we cannot yet pretend to have completely mastered all details connected with the local raising of suitable subsidiary rotation crops.

We may now pass on to a detailed consideration of the average monetary returns from the first series of the rotation plots.

ROTATION PLOTS.—FIRST SERIES.

It has already been stated that after several variations the rotation of this series has been settled definitely on the following lines:—

1. Turnips Forage root crop.
2. Barley Grain crop.
3. Peas Leguminous forage crop.
4. Wheat Main grain crop.

Turnips.—In the third report of the Permanent Experiment Field we have already stated it to be our opinion that neither turnips nor swedes can, in countries in which they are of necessity winter sown, have the great value that attaches to them in those countries in which they make summer growth and supply an abundance of succulent food throughout the winter months when nothing else is available. It is on these points that has rested their great success in British and New Zealand farming. There appears no reason why it should not be repeated in our cooler districts, such as the South-East; for the Lower North, however, it cannot be anticipated. Here, turnips become available in the early spring when there is always present an abundance of natural and far less costly sheep feed elsewhere, and they run up to seed on the first approach of warm weather; hence, although in favorable circumstances they certainly supply an abundance of feed, they need to be fed down heavily and rapidly to be of any use. There is no doubt, however, that much value attaches to them as sheep forage crop; and even in the Lower North we are disposed to recommend them for topping up lambs that may have suffered somewhat from a shortage of winter feed, providing always that the land be not too heavy for the purpose.

We append below, in Table IX., a summary of what have proved to be the returns from the four turnip crops raised in this rotation:—

TABLE IX.—*Showing Returns from Turnip Crops, 1907-1910.*

Year.	Average Number of Sheep per Acre.	Number of Days Grazing.	Average Number of Sheep for 265 Days.	Grazing Value of Turnips at 15s. a Sheep per Annum.	Increase in Live Weight per Acre.
				£ s. d.	lbs.
1907	56.19	21	2.23	2 8 6	?
1908	47.12	21	2.71	2 0 8	158
1909	38.01	34	3.54	2 13 1	755
1910	25.53	45	3.15	2 7 3	426
Means	41.71	30	3.16	2 7 4	446

Thus, over the four seasons under consideration the turnip crop has, on an average, maintained close on 42 sheep to the acre for 30 days; this represents 3.16 sheep to the acre for the whole year. The average increase in live weight on the turnip plots has been represented by 446lbs. per acre, or a little over $\frac{1}{2}$ lb. per sheep per day. Assuming the gross annual returns from a sheep to be represented by 15s., the average value of the crop of turnips has been represented as the equivalent of £2 7s. 4d. per acre.

It should be remarked that when grown in rotation the turnip crop is essentially expensive from the point of view of cultivation. On the other hand, it cannot be overlooked that it is what is known as a fallow crop, in the sense

that it prepares the way for the cereal that follows—barley in this instance—and reduces the cultivation expenses of the latter. Thus, there is no need to plough the land after turnips—cultivators, scarifiers, or harrows will secure all that is needed in the way of tilth by the barley crop. On the other hand, when turnips follow wheat, as is the case in this rotation, weeds offer both a perplexing and costly problem for solution. As a fallow crop, turnips should be a land-cleaning crop, i.e., a crop that helps to clear the land of weeds for crops that follow; this involves a fair amount of horse and hand hoeing, which, when compared with the normal treatment of bare fallow, must always prove relatively expensive. It is, of course, true that the fact that a turnip crop must be fed down both early and rapidly must prevent the bulk of weeds present from ever going to seed. On the other hand, a turnip crop that is overgrown with weeds, as must be the case if horse or hand hoeing are neglected, can never appeal to the farmer who takes any pride in his work; nor, indeed, can it ever be expected to make the root-growth of a clean crop.

In those countries in which mixed farming implies a more varied system of cropping than is as yet the case here, experience has shown that what farmyard manure is available is applied with most advantage to the root crop opening the rotation. We have, therefore, adopted this practice in these rotation plots, and dressed the turnip crop with farmyard manure at the rate of 20 tons to the acre. This dressing of farmyard manure, which the land receives once in four years, may be taken to make its influence felt on the subsequent crops of the rotation; that it had no blighting effect on the wheat crop following three years later we have had ample evidence in the heavy wheat crops already recorded. Whilst we are satisfied that this dressing is not too heavy for the requirements of the crops which it is intended to help along, we recognise that it is excess of what farmyard manure is likely to be available for the purpose on average farms. We have determined, therefore, to reduce the dressing in future years to 10 tons to the acre, so as to conform more closely to what might be looked upon as possible local practice. An additional inducement to the practice is the fact that the rotation, as at present conducted, includes two crops out of four that are fed down on the land; in the original scheme this was not contemplated.

Finally, these plots may be taken to illustrate indirectly the influence of deep ploughing. There is an opinion very current amongst some South Australian farmers that deep ploughing is apt to ruin land for cereal-growing, if not for all time, at all events for a considerable number of years. In our view this opinion must rest on imperfect observations, possibly on misinterpreted ones. We must point out that the plots of this rotation have been subsoiled to a depth of 12in. once in four years, the year in which they come under turnips. Notwithstanding this, the wheat yields of these plots have practically equalled those of wheat after bare fallow on an ordinary furrow.

Barley.—Barley forms the second crop in the rotation of this series. Details concerning its returns over the four seasons under consideration are shown thus :—

TABLE X.—*Showing Returns from Barley in Rotation Plots of First Series from 1907 to 1910.*

Year.	Grain per Acre.	Value of Grain at 2s. a bushel.	Stubble Grazing.				Total Barley Returns.
			Sheep per Acre.	Number of Days Grazing	Equivalent Sheep per Acre per Annum.	Value of Grazing.	
	bush. lbs.	£ s. d.				£ s. d.	£ s. d.
1907..	10 29	1 1 2	21.95	29	1.74	1 6 1	2 7 3
1908..	18 32	1 17 3	2.57	50	0.42	0 6 4	2 3 7
1909..	20 23	3 0 11	8.20	40	0.90	0 13 6	3 14 5
1910..	43 0	4 6 0	15.57	10	0.71	0 10 9	4 16 9
Mean.	25 34	2 11 4	14.57	35	0.94	0 14 2	3 5 6

A few words of explanation relative to Table X. should now be given. It will be noted in the first place that barley yields, particularly in the first two years, are much below what might have been expected of them ; indeed, they are considerably below the general farm average for those years, as the following figures will serve to show :—

1907, General farm barley average,	31bush. 21lbs. from 79.30 acres.
1908	" " 43bush. 49lbs. from 94.83 acres.
1909	" " 35bush. from 75.27 acres.
1910	" " 37bush. 9lbs. from 113.42 acres.
Means	" " 36bush. 45lbs. from 90.71 acres.

Thus on the farm, for the four seasons under consideration, the barley yield was represented by an average yield of 36bush. 45lbs. against 25bush. 34lbs. in the rotation plots, and, at 2s. a bushel, by a gross return of £3 12s. 2d. against £2 11s. 4d. It is possible that the farmyard manure applied to turnips in the year immediately preceding the barley crop may have had a blighting influence on the latter. The exceedingly low yield of 1907, however, is to be accounted for on other grounds. The barley crop was fed down heavily from July 24th to 29th by a flock of sheep at the rate of 83.22 sheep to the acre. Since then experience has shown that in this district it is not as a rule safe to feed off a crop later than the last week in June. In a season such as 1907 eventually proved to be, with a dry winter followed by a hot, dry spring, late feeding-off proved fatal. The crop never recovered from the ordeal, and made such poor straw growth that we were unable to cut it with the binder, and had to strip it. On the other hand a poor yield in 1908, in every way an excellent year, is less easily accounted for, except on the score of blighting off.

Between harvest time and the breaking of the barley stubbles for the pea crop, a certain amount of grazing is always available. This in its actual results we have summarised in Table X. under the heading of "Stubble Grazing."

It will probably be noticed that the amount of grazing shown to be available in 1907—equivalent to 1.74 sheep to the acre per annum—is considerable in excess of that available in other years. It should therefore be stated that in this year is included under this heading the feeding-off equivalent of the spring grazing already adverted to. We thought it best to include it here in order to avoid further complications in the table; hence the average grazing value of barley stubbles should be represented by 0.66 sheep per acre per annum, and not 0.94 as indicated in the table. This arrangement, however, does not in any way affect the average gross returns of the barley crops, which are represented by £3 5s. 6d. per acre.

Peas.—In this connection it had originally been intended that the pea crop should have been allowed to come to complete maturity and subsequently harvested in the ordinary way. With this object in view it was our usual practice to put the crop in somewhat late, so as to give it a good chance of escaping frosts at bloom time. In our experience, however, the pea crop offers harvesting difficulties, which tend to neutralise its value as a farm crop. Whatever process be adopted, pea-harvesting is with us not only a slow, tedious operation, but it is apt to take place at a time of the year when other more important farm operations cry urgently for all available hands; hence since 1908 we have treated the pea crop as a forage crop to be fed down by sheep. This change of policy has led to early autumn sowing, as best calculated to yield a heavy quantity of green feed. The crop has been fed down some time after the formation of the pods, and before the haulms begin to wilt off. Results secured since 1908 by this form of treatment are shown below:—

TABLE XI.—*Showing Returns from Peas fed down by Sheep from 1908 to 1910.*

Year.	Average Number of Sheep per Acre.	Number of Days Grazing.	Equivalent Number of Sheep per 365 Days per Acre.	Grazing Value of Peas at 15s. a Sheep per Annum.	Increase in Live Weight per Acre.
				£ s. d.	lbs.
1908	14.55	43	1.71	1 5 8	285
1909	17.47	53	2.54	1 18 1	380
1910	25.75	36	2.54	1 18 1	333
Means.....	19.26	44	2.26	1 13 11	333

Thus three years' experiments prove the grazing value of an acre of peas to be equivalent to about two and a quarter sheep to the acre per annum. The average increase in live weight has been represented by about 333lbs. per acre, or close on two-fifths of a pound per sheep per day.

We wish to point out that in 1908 the peas were put in on June 2nd, that is to say relatively late; whilst in 1909 they were sown on April 29th, and in 1910 on May 7th. It will be noted that in each instance the early-sown peas had a proportionately higher grazing value, represented roughly by

$\frac{1}{3}$ of a sheep per acre per annum. Nor do we think that in this case the influence of an individual season counts for much, for from the point of view of the pea crop all three seasons were excellent.

In 1908 the peas were fed down between October 28th and December 10th; in 1909 between August 17th and October 18th; and in 1910 between November 2nd and December 8th. Thus in both 1908 and 1910 peas were availed of at a time when natural feed was considerably on the wane. The handling of the crop in 1909 differed somewhat from our usual practice, and as it will serve to furnish additional data illustrating the value of peas as a forage crop, we append below a few details on the subject.

The 1909 crop was not wholly fed down with sheep. Between August 17th and September 26th, that is to say a period of 41 days, it was mown with the scythe and fed in the green state to steers that were being fattened for the market in confinement. The number of steers under treatment represented 3.06 per acre of peas; and as during this period they received no other food, what increase in weight was secured must be wholly credited to the peas. The average weight of these steers on August 17th was 815.83lbs., representing a total weight per acre of 2,496.44lbs.; the average weight on September 26th was represented by 916.50lbs., and the total weight per acre 2,804.49lbs. This represents an average individual gain per steer in 41 days of 100.67lbs., and an increase per acre for the same period of 308.05lbs.

The total weight per acre of the green pea crop reached 9 tons 11cwts. 46lbs.; hence every 70lbs. of green peas was responsible for an increase in live weight of 1lb.

On the other hand, 500lbs. of green peas dried to the condition of ordinary hay were reduced to 155lbs., representing a loss of 69 per cent. of the original weight on drying; hence the 9 tons 11cwts. 46lbs. of green peas to the acre represented the equivalent of 2 tons 19cwts. 38lbs. of dried hay to the acre.

The weight of an average Merino wether we take to be about 120lbs. In calculating our results shown in Table XI., we have therefore assumed that one of these steers, averaging originally 815.83lbs., was equivalent to six and a half wethers.

After being cut down with the scythe the pea crop made a second growth, which was fed down with sheep for 12 days at the rate of 9.22 sheep to the acre, representing 0.30 sheep per acre per annum. The increase in weight per acre over this period was represented by 71.88lbs., or close on $\frac{1}{3}$ lb. per sheep per day.

In conclusion, we have no hesitation in recommending peas as a suitable crop in this district to precede wheat, particularly if sown early and availed of as a forage crop on the lines that have been indicated by us.

Wheat.—Finally, it remains for us to show what have been the gross returns from the wheat crops grown in this rotation. In this connection we can

take into consideration only those seasons in which the rotation has been definitely closed, that is to say those in which the wheat crop can show behind it at least three years' continuous cropping. We find ourselves, therefore, limited to the seasons 1908, 1909, and 1910. Full details concerning the returns over these three years are shown below :—

TABLE XII.—*Showing Gross Returns from Wheat in Rotation of the First Series.*

Year.	Grain per Acre.	Value of Grain at 3s. 6d. a Bushel.	Stubble Grazing.				Total Gross Returns.
			Sheep per Acre.	Number of Days Grazing.	Equiv'lent Sheep per Acre per Annum.	Value of Grazing at 15s. a Sheep.	
						£ s. d.	£ s. d.
	Lush. lbs.	£ s. d.					
1908 ..	27 26	4 16 0	8.69	22	0.52	0 7 10	5 3 10
1909 ..	27 19	4 16 9	6.64	18	0.35	0 5 3	5 2 0
1910 ..	23 22	4 1 9	26.51	4	0.29	0 4 4	4 6 1
Means.	26 9	4 11 6	13.95	15	0.39	0 5 10	4 17 4

SUMMARY OF GROSS RETURNS FROM ROTATION OF THE FIRST SERIES.

We are now in a position to summarise what have proved to be the gross returns of the four-course rotation we have had under consideration. They are distributed as follows :—

	£	s.	d.
Turnips	2	7	4
Barley	3	5	6
Peas	1	13	11
Wheat	4	17	4

Total gross returns£12 4 1

Thus the total gross returns of four years have in this form of rotation been represented by £12 4s. 1d. from 1907 to 1910. Before entering upon any comparison of these returns and those of wheat after bare fallow for the same period we shall first endeavor to ascertain what have been the gross returns of the second type of rotation illustrated in the Permanent Experiment Field.

ROTATION PLOTS.—SECOND SERIES.

After various changes the rotation plots of the second series have been arranged as follows :—

1. Kale Forage crop
2. Oats Subsidiary cereal crop
3. Vetches Leguminous forage crop
4. Wheat Main crop

Kale.—Kale, like turnips, is a crop which, according to local climatic conditions, admits of being either winter or summer grown. In the latter

case it always proves an abundant source of winter feed, whilst in the former it comes in for use both in early and late summer. Unlike turnips, however, kale under our special conditions is not spoilt by the first breath of summer heat; and as such is, in our view, a forage crop eminently suited to both hot and cold climates alike. In districts such as our own there is, as a rule, no need to enter the kale field until such time as all vestige of greenness shall have disappeared from ordinary grass paddocks. If handled judiciously it will continue throwing out green shoots throughout the summer months, and March rains will bring out succulent growth from even the driest of stumps. This crop was not introduced into the Permanent Experiment Field until 1908. We can therefore give the record of only three seasons. The general experience of the College Farm, however, extends very much further back, in so far as this forage crop is concerned, for it is on record as far back as 25 years ago that Professor Custance was a strong advocate of kale, and off and on we have grown it ever since. In the summarised results, given below in Table XIII., it is to the thousand-headed kale that reference is made, as we have always found it best for sheep feed.

TABLE XIII.—*Showing Gross Returns from Kale, 1908-10.*

Year.	Average Number of Sheep per Acre.	Number of Days Grazing.	Equivalent Number of Sheep per Acre per Annum.	Grazing Value of Kale at 15s. a Sheep per Annum. £ s. d.	Increase in Live Weight per Acre. lbs
1908	7.86	81	1.70	1 5 6	334
1909	15.08	58	2.39	1 15 10	215
1910	25.38	45	3.13	2 7 0	511
Means.....	16.11	61	2.41	1 16 1	352

Thus in these plots a crop of kale has supported an equivalent average of 2.41 sheep to the acre for 12 months. In our view, however, these figures do not do full justice to kale as a forage crop—at all events when compared with the collateral evidence of the larger areas of the College Farm. We have therefore thought interesting to set out in Table XIV. the general returns from kale on the College Farm since 1906.

TABLE XIV.—*Showing general returns from Kale on the College Farm, 1906-10.*

Year.	Acreage.	Average Number of Sheep per Acre.	Number of Days Grazing	Equivalent Number of Sheep per Acre per Annum.	Grazing Value of Kale at 15s. Per Sheep per Annum. £ s. d.
1906	20	13.73	111	4.18	3 2 8
1907	28½	6.65	80	1.46	1 1 11
1909	23	10.67	128	3.74	2 16 1
1910	3½	21.05	49	2.83	2 2 5
Means.....	—	13.02	92	3.05	2 5 9

Oats.—In this rotation oats have taken the place of barley as subsidiary cereal. We regret that in our estimates we are unable to take account of more than the returns of the last two seasons, and this mainly because in earlier years through an error of judgment we omitted to sow oats sufficiently early in the season to permit of anything like satisfactory growth, and because in one season at all events we were imprudent enough to have recourse to a variety of oats altogether untried so far as this district is concerned, which resulted in total failure. We feel, therefore, that it would be hardly fair to credit the form of rotation which we happen to be testing with these shortcomings of ours, and have therefore confined our estimates to the 1909 and 1910 seasons. The results are summarised as follows:—

TABLE XV.—*Showing Gross Returns from Oats in Rotation of the Second Series, 1909-1910.*

Year.	Grain per Acre.	Stubble Grazing.						
		Value of Grain at 2s. a Bushel.	Sheep per Acre.	Number of Days Grazing.	Equivalent Sheep per Acre per Annum.	Value of Grazing at 15s. a Sheep.	Total Gross Returns.	
	bush. lbs.	£ s. d.				£ s. d.	£ s. d.	
1909	31 27	3 3 4	9.67	18	0.48	0 7 2	3 10 6	
1910	21 30	2 3 6	25.41	10	0.70	0 10 6	2 14 0	
Means...	26 28	2 13 5	17.54	14	0.59	0 8 10	3 2 3	

Vetches.—Since 1908 vetches fed off by sheep have in this rotation represented the leguminous forage crop preceding wheat; prior to 1908 their place had been taken by horse beans. We had, however, to discard this crop, as we found it more or less unsatisfactory. The gross returns from vetches are summarised in the following table:—

TABLE XVI.—*Showing Gross Returns from Vetches in Rotation of the Second Series, 1908-1910.*

Year.	Average Number of Sheep per Acre.	Number of Days Grazing.	Equivalent Number of Sheep per Acre per Annum.	Grazing Value of Vetches at 15s. a Sheep per Annum.	Increase in Live Weight per Acre.
				£ s. d.	lbs.
1908	17.63	38	1.84	1 7 7	128
1909	58.71	21	3.38	2 10 8	296
1910	25.45	41	2.86	2 2 11	491
Means.....	33.93	33	2.69	2 0 5	305

Thus in gross returns vetches have been worth to us a little over £2 an acre. If we compare these returns with those secured from peas in the

preceding rotation we shall find them on the whole to be somewhat higher. Thus the mean sheep-carrying capacity of vetches was represented by 2.69 per acre per annum, whilst that of peas by only 2.26. These results have certainly taken us by surprise, as the pea crop has invariably had the appearance of greater luxuriance; it appears probable that its broader, more compact foliage contributes to the illusion. It should be added that when peas are being fed off there is probably a greater waste from treading down than is the case with vetches.

In 1909, as was the case with peas, the vetches were mown with a scythe, and partly fed to steers and partly put into ensilage pits; the aftermath was grazed off with sheep. The total weight of green vetches was represented by 10 tons 11cwts. 75lbs. to the acre; that is to say, about 1 ton to the acre in excess of the pea crop, which, however, was cut earlier in the season. Of this crop 3 tons 6cwts. 85lbs. were fed to steers in confinement at the rate of 3.04 steers to the acre for a period of 19 days. The original average weight of the steers was represented by 916.50lbs., whilst their weight at the end of the feeding test had risen to 941.17lbs.; that is to say, that they made a gain of about 24½lbs. individually in 19 days. In this case each pound of live weight increase was represented by the consumption of between 99lbs. to 100lbs. of green vetches, as against only 70lbs. of peas in the previous test.

WHEAT.

As in the preceding rotation, and for reasons already given, we can take into consideration only the results of the last three seasons, in which alone each wheat crop can show behind it at least three years of continuous cropping.

TABLE XVII.—*Showing Gross Returns from Wheat in Rotation of the Second Series, 1908-10.*

Year.	Grain per Acre.		Value of Grain at 3s. 6d. a bushel.	Sheep per Acre.	Number of Days Grazing.	Stubble Grazing.		Value of Grazing at 15s. a Sheep.	Total Gross Returns.					
						Equivalent Sheep per Acre per Annum.								
	bush. lbs.	£	s.	d.			£	s.	d.	£	s.	d.		
1908	31	42	5	10	10	8.13	20	0.67	0	10	0	6	0	10
1909	29	27	5	3	1	15.35	8	0.34	0	5	1	5	8	2
1910	22	6	3	17	4	25.84	8	0.57	0	8	7	4	5	11
Means . . .	27	44	4	17	11	16.44	15	0.52	0	7	11	5	5	0

On comparing these gross returns from wheat in the second rotation shown above with those of wheat in the first rotation given in Table XII., we see that the former are on the whole the higher of the two, viz., £5 5s. against £4 17s. 11d.

SUMMARY OF THE GROSS RETURNS FROM ROTATION OF THE SECOND SERIES.

We may now proceed to summarise the total gross returns of the four crops of the rotation :—

	£	s.	d.
Kale	2	5	9
Oats	3	2	3
Vetches	2	0	5
Wheat	5	5	0

Total gross returns £12 13 5

The total gross returns for the four years therefore—£12 13s. 5d.—very closely approximate those of the first rotation, viz., £12 4s. 1d.

WHEAT AFTER BARE FALLOW.

Let us now see what have been the gross returns of wheat after bare fallow in plots adjacent to the rotation plots. These are plots 10 and 11, whose gross returns are summarised below in Table XVIII. Strictly speaking, perhaps, 1907 returns should have been included in our estimates; but since we found ourselves obliged to omit them in the case of wheat in rotation we have thought it better to follow the same course in the case of wheat after bare fallow.

TABLE XVIII.—*Showing Gross Returns from Wheat after Bare Fallow, 1908-10.*

Year.	Grain per Acre.	Value of Grain at 3s. 6d. a bushel.	Stubble Grazing.				Total Gross Returns.
			Sheep per Acre.	Number of Days Grazing.	Equivalent Sheep per Acre per Annum.	Value of Grazing at 15s. a Sheep.	
	bush. lbs.	£ s. d.				£ s. d.	£ s. d.
1908	32 46	5 14 8	11.39	24	0.75	0 11 3	6 5 11
1909	29 54	5 4 8	5.38	53	0.78	0 11 8	5 16 4
1910	19 49	3 9 4	9.95	26	0.71	0 10 9	4 0 1
Means... 27	30	4 16 3	8.91	34	0.75	0 11 3	5 7 6

Thus the average gross returns from wheat after bare fallow proved to be £5 7s. 6d. an acre per annum. It should be noted in this connection that the sheep-carrying capacity of the stubbles of wheat that is both preceded and followed by bare fallow must always prove heavier than is the case when the land must be taken in hand almost immediately after harvesting operations, with a view to bringing it into a fit state to receive an autumn-sown crop.

In a period of four years there can only be two harvests from wheat grown continuously after bare fallow; hence the total gross returns from wheat after bare fallow would be represented by £10 15s. 0d. for a period of four years.

GENERAL COMPARISON OF GROSS RETURNS FROM FOUR-COURSE ROTATIONS
AND WHEAT AFTER BARE FALLOW.

The total gross returns for the two four-course rotations were represented respectively in the Permanent Experiment Field by (A) £12 4s. 1d. and (B) £12 13s. 5d.; whilst we have just seen that those from wheat after bare fallow amounted to £10 15s. 0d. These figures imply a balance of £1 9s. 1d. an acre in four years in favor of rotation A, and of £1 18s. 5d. in favor of rotation B, over and above the mean gross returns from wheat after bare fallow.

The difficulties involved in the determination of figures of this kind have already been adverted to; a recapitulation of them is, therefore, unnecessary. We wish, however, to state again that the number of seasons upon which we have been able to draw is not, in our opinion, sufficiently extensive to enable us to ask for the final acceptance of our figures. Our experimental work will, in the future, be continued on the same lines; and in the course of years we hope to be in a position to make on the subject more authoritative statements.

In the meanwhile, and subject to these reservations, it should be stated that the differences in favor of the rotations in question, viz., £1 9s. 1d. and £1 18s. 5d. per acre for four years respectively, cannot possibly cover the additional outlay involved in raising the subsidiary crops. It may be that we shall be expected to show how this outlay is made up; and, indeed, if the differences in favor of the rotations had proved greater we should have endeavored to do so. It is, of course, one thing to show that gross returns under rotation are in excess of those secured by ordinary local practice, but quite another to prove that they are more profitable. We do not pretend, in this instance, that such has proved to be the case; whilst, on the other hand, unless the differences be very considerable and the issues very clear cut, we doubt very much whether the purely experimental field can be asked to determine the profitableness or otherwise of general farm operations. No practice can be recognised as directly profitable until it has been proved so in the field under conditions normal to ordinary practice. Experimental work has to be so surrounded with care and attention altogether disproportionate to the actual money value of the crops involved that it is never easy to disengage from what constitutes normal expenditure that which is essentially inherent to all carefully conducted experimental work. Later on, perhaps, we may have occasion to approach this aspect of the question from the more satisfactory side of our ordinary field results.

THE SUMMER CROP WHEAT ROTATION.

We have already stated our general opinion on the unprofitableness in this district of a summer fallow crop preceding a wheat crop. We are able

to demonstrate this point still further in Tables XIX. and XX. In the former we have summarised the gross returns from wheat after a summer crop, and in the latter the actual grazing returns from the summer crop. We have restricted our estimates to seasons 1908-1910, to facilitate a comparison with the preceding rotations. It should be stated that these three seasons were, on the whole, more favorable than the normal season to both the summer crop and the wheat crop that followed it.

TABLE XIX.—*Showing General Gross Returns from Wheat following a Summer Fallow Crop. 1908-1910.*

Year.	Grain per Acre.	Value of Grain at 3s. 6d. a Bushel.	Stubble Grazing.					Total Gross Returns.
			Sheep per Acre.	Number of Days Grazing.	Equiv'ent Sheep per Acre per Annum.	Value of Grazing at 15s. a Sheep,		
	bush. lbs.	£ s. d.					£ s. d.	£ s. d.
1908	28 16	4 18 11	2-39	62	0-41	0 6 2	5 5 1	
1909	20 40	3 12 7	5-60	47	0-72	0 10 10	4 3 5	
1910	18 25	3 4 5	13-23	21	0-76	0 11 5	3 15 10	
Means....	22 27	3 18 10	7-07	43	0-63	0 9 6	4 8 1	

TABLE XX.—*Showing Gross Returns from Grazing of Summer Crop.*

Year.	Average Number of Sheep per Acre.	Number of Days Grazing.	Equivalent Number of Sheep per Acre per Annum.	Grazing Value of Sorghum at 15s. a Sheep.	Increase in Live Weight per Acre.
				£ s. d.	lbs.
1908	56-92	4	0-62	0 9 4	—
1909	36-52	10	1-00	0 15 0	122
1910	26-42	13	0-94	0 14 1	8
Means.....	39-95	9	0-85	0 12 10	65

Thus, then, the average gross returns from wheat after a summer fallow crop was represented by £4 8s. 1d. an acre, and the average gross returns from the grazing of the summer crop by 12s. 10d. an acre. For a period of four years this would represent gross returns totalling £10 1s. 10d.; that is to say not quite as much as the gross returns from wheat after bare fallow for a similar period, viz., £10 15s. 0d. On these figures, therefore, sorghum can hardly be looked to as a source from which the general farm revenues of the district may be expected to be increased.

(To be continued.)

POULTRY-KEEPING.

OPERATIONS FOR JULY.

BY THE POULTRY EXPERT (MR. D. F. LAURIE).

During this month the bulk of the chickens of the heavy breeds should be hatched. The season for the heavy breeds, except in very late localities, should end in August. An extended experience shows that late-hatched chickens of the heavy breeds seldom thrive. They feather with difficulty, and are generally stunted. One of the worst features in our poultry trade is the great number of w^eddy, late-hatched birds which appear in the markets, or are seen in breeders' yards. The exhibition breeder knows that he can neither win prizes nor keep up the quality of his stock unless he hatches early enough to ensure prolonged growth, and takes full advantage of the cool and mild weather before the heat of the summer sets in. Much of the trouble with the utility strains of different breeds is due to late hatching. The majority of breeders use pullets in the stud pens, and in many cases these pullets are late hatched and stunted. They have but little stamina, and so their stock does not improve. In the rage for egg production many of our valued breeds have been discounted by the vaunted virtues of undersized mongrels, some few of which were fair layers. The evils of mongrelising the all-round breeds may be noted in the fact that of the numerous much-advertised laying strains of Orpingtons and Wyandottes but few remain to uphold their claims. Public tests in the competitions have proved this fact.

Dry Feeding.—Chickens must be fed on dry mash from an early date if the system is to be adopted. Older birds, which have been accustomed to wet mash, or even whole grain, do not thrive on the dry mash food. This has been demonstrated at the poultry stations during a series of tests. It has been the experience of numerous breeders that dry mash feeding is not suited to the heavy breeds, as they eat too much and become very fat. Leghorns, Anconas, Andalusians, and Minorcas do very well if they are fed on dry mash from hatching time onwards. The usual dry mash is bran and pollard mixed with a little grit, a little coarse bone, and fine charcoal, and cracked grain of various sorts. The mash is fed in hoppers. These hoppers will contain perhaps a week's supply, which falls gradually into the trough from which the birds eat. This must be arranged so that the birds cannot

scratch out the food, selecting some and rejecting the rest. A slip of wire netting, of inch mesh, laid loosely on the top of the food in the trough will prevent scratching, while at the same time the birds can help themselves to the food. The main contention in favor of dry-mash feeding is that its adoption saves time and work. Another claim made is that, as the birds must of necessity eat slowly, the food is well mixed with saliva and digested more satisfactorily.

Cleanliness.—The majority of the ailments of poultry can be traced to want of cleanliness on the part of the breeders.

Yards and Houses.—During the recent wet weather I have noted many cases where the yards were inches deep in mud and filth, and the houses draughty and wet. Poultry cannot be expected to thrive under such conditions, which are also a menace to human beings. I am glad to notice that the Metropolitan Board of Health contemplates action in the direction of improving conditions. To keep poultry under such conditions is distinctly cruel. Their owners must be callous and careless. I have seen ducks kept under such filthy conditions that the neighborhood reeked with the awful smell. For winter weather the birds should be provided with proper scratching-shed houses. Those who will not provide proper accommodation should be debarred from keeping poultry.

Incubators and Brooders.—Incubators should be well scrubbed out after each hatch, and then fumigated, while wet, with sulphur. The brooders should also be frequently scrubbed and disinfected with a 10 per cent. solution of commercial formalin. The cleansing should be outside as well as inside. Last season much mortality was caused by what is commonly called "little chick" diarrhœa, which is due to a micro-organism.

The floors of brooders should be covered with clean sandy soil, which should be renewed at intervals. It is not sufficient to sift out the manure, &c. Where sandy material is difficult to procure the sieve may be used and the sand or earth baked. It may also be sterilised with liquid germicides and then dried. Fresh earth and sand is the best material, as sand alone lacks body.

The soil in yards and floors of houses should be sterilised occasionally by applying with a watering can any good germicide. Then the ground should be forked over. The earth of the floors of houses should be removed to the depth of 6 in., and fresh earth filled in and rammed. Where concrete floors are in use the work is simplified.

Water Pots and Food Vessels should be kept scrupulously clean and should occasionally be disinfected. No food should be allowed to remain to become stale. The water should be fresh and clean, and renewed at least once a day in cold weather, and as often as required later when the weather will be hot.

Food.—Do not throw food for poultry on the ground, especially in dirty, muddy yards. The birds will pick up filth and most likely disease germs.

Do not feed unsound food. Many people think decayed meat and vegetables, putrid milk, musty bran, pollard, and grain are quite good enough for poultry. You cannot expect your birds, if so fed, to be healthy or to lay eggs free from objectionable taint. Foods are musty, sour, or putrid, owing to the action of micro-organisms, which will, if ingested, become the primary or secondary cause of disease.

Dirty Eggs.—Do not market dirty-shelled eggs, because such eggs are proof of dirty habits and are not attractive to the buyer. Dirty eggs should not be used for hatching—the dirt contains harmful organisms. Some people apparently rejoice in the presence of filth, and laugh to scorn the warnings of those who know the dangers from the ever-present disease germs if unchecked.

"Sanitation" should be the motto of every poultry-breeder. Throughout the world it is recognised that without scrupulous attention to the details here enumerated losses will occur which will ruin or dishearten many who might have kept poultry with much profit.

Green Food.—Do not forget to plant plots of fodder to provide green food for the poultry. In all cases the ground should be well prepared and manured; otherwise the yield will be poor. During July the following may be planted out in rows:—Cabbage, kail (thousand-headed and Jersey), cabbage-lettuce, endives (very valuable and much used in America), silver beet (there are improved varieties). All these should be planted in rows—kail requires plenty of space. Grade the ground so that the beds can be irrigated in the summer.

Rape, oats, and barley may be broadcasted on well-manured ground so that the crop may grow quickly and thickly.

Prepare ground now and work at intervals for sowing with lucerne in September. Lucerne is the best and most profitable of all poultry green foods, and will grow anywhere in the State if well watered in the summer. In growing any kind of green food, small plots well cultivated and manured will produce far more green food than large areas ill cultivated and lacking fertilisers. A small hand plough, to be bought for a few shillings, will be found excellent for cultivating kail, cabbage, and fodders growing in rows or drills. Poultry manure, used with discretion, will make a suitable fertiliser for the above. It should be well mixed with the soil. For summer use it should be broadcasted and hoed in prior to applying water.

Hedges and Live Shelters.—With the exception of a few favored localities, our country suffers, as regards poultry, from lack of shelter. The fashion appears to be in favor of cutting down all trees and sheltering growths, and wind-swept plains result. Experience has shown that in all parts of the State much can be done to provide shelter by planting trees and shrubs, many of which can be had free on application to the Conservator of Forests.

Poultry yards should be sheltered by planting sugar gums, pines, carobs, &c. In other localities hedges of carob, olive, wattle, tagosaste, &c., may be planted, and if attended to will quickly grow. The cold winds sweeping along day and night completely upset the fowls, cause false moults, and stop egg production. It is not advisable to plant trees in the yards or runs. Efficient sun-shelters can be provided which give better results. The ground should be well prepared and planting finished with as little delay as possible.

Disposal of Eggs and Table Poultry.—The Government Produce Department, Light Square Branch, undertakes the sale of eggs and poultry. As the season when eggs are more abundant is close at hand, breeders are advised to arrange as soon as possible. Information may be obtained on application to the General Manager, Produce Department, Adelaide, or to the Poultry Expert, Department of Agriculture, Adelaide. Proper egg cases, fitted with cardboard fillers, which will reduce breakages to a minimum, can be supplied at cost price. Table poultry of all sorts are received, killed, and sold to the trade at best prices ruling. You are advised to forward clean-shelled, infertile eggs and grade in two sizes. For large, clean-shelled, fresh eggs a penny a dozen above market sales can be obtained. All poultry should be well fattened. Send it while young and prime; do not wait until age has reduced its value.



Taking Wild Bees' Honey.

CULTURE OF MANGELS AND WURZELS.

By W. J. COLEBATCH, B.Sc., Superintendent of Agriculture,
South-East.

*(Delivered at the Meeting of the Mount Gambier Agricultural Bureau,
on May 13th.)*

There are comparatively few districts, even along the coastal areas of Australia, in which the regular and systematic cultivation of root crops may be advocated with confidence. In South Australia their growth is likely to be restricted to the Mount Lofty Ranges, the southern, and South-Eastern districts. That portion of the South-East lying to the south and west of Naracoorte possesses climatic and soil conditions that are eminently adapted to meet the demands of such crops. It is doubtful, however, whether they are destined to become a recognised feature of the farming practice north of Keith. Between the Tatiara district and Naracoorte there is reason to think that they will eventually justify their inclusion in the system of cropping; but, owing to the difficult nature of the soil, they can never be expected to yield the returns in these regions that will be obtained from them further south.

In the past, generally speaking, the land has been held in blocks sufficiently extensive to make the holders almost independent of the cultivation of root and forage crops. They have been able to make the land yield good returns by grazing the natural pastures and concentrating their energies on the growth of cereals and, in some parts, potatoes. But the production of home-grown fodders for dairy stock, young cattle, sheep, and pigs has not received the attention that it deserved. With the advent of closer settlement this defect must needs be remedied; indeed, it is not too much to say that the ultimate success of this new system in the South-East will depend in a very large measure on the ability of the new settlers to grasp the principles of mixed farming and translate them into practice. On their small holdings it will not be found sufficient to depend on wool and grains: they will have to turn their earnest attention to the cultivation of roots and forage crops generally, so that dairying may be made a profitable branch of the work all the year round, and in order to afford themselves opportunity for fattening off their surplus stock in time to catch the best markets. By so doing they will improve the quality of the grass paddocks and increase the carrying capacity of their farms.

It may be argued that the growth of such crops as maize, millet, sorghum, lucerne, field peas, mustard, and rape, in conjunction with stubble feed and the natural pasture, will provide all the feed required and render it unnecessary to have recourse to crops like mangels and turnips that demand so much time and labor. To do so, however, would indicate a lack of knowledge as to the main purpose of root-growing, which is to provide succulent, nutritious fodder during the winter, spring, and early summer months. True, by ensiling such crops as maize, sorghum, and millet a store of useful feed may be provided for winter and summer use; but silage has not the virtues of sound, well-grown roots, nor is it so serviceable for stock when fed with good oaten straw. Moreover, I am not at all sure that the summer crops just mentioned can be relied upon to yield good returns on the average of seasons in the colder portions of the South-East. Lucerne, peas, rape, and mustard are all well suited to supply summer fodder, and the rape and mustard may also be sown in the autumn for winter forage; but such crops must be fed off when they are ready, and cannot be placed in store for use as required. The great advantage that root crops have over other fodder plants is that they possess valuable keeping qualities, and are easily and inexpensively stored.

Roots are the mainstay of winter, spring, and early summer feeding of sheep and cattle in Great Britain, on the Continent of Europe, and in New Zealand, and it has been observed that where they form one of the main features of the system of cropping the farming is almost invariably of a high order. They are not always a directly remunerative crop in older countries; indeed, they are more often grown at a loss, but this loss is rightly regarded as a portion of the cost of preparation of the land for the succeeding cereal. When the crop just pays its way and leaves the manure behind as profit the farmer at home is generally pleased. In the colonies, however, root crops are expected to give a direct return.

Roots are exceedingly palatable to stock, and they possess high feeding properties. Quite recently it has been demonstrated experimentally in Denmark that the dry matter they contain is equal pound for pound in dietetic value to that in mixed cereal grains. No doubt their succulence adds to their digestibility and increases their worth as food for farm stock.

In this article the cultivation of the two kinds, viz., mangels and turnips, which are calculated to help in a material way the agricultural development of the South-Eastern district, will be discussed, and the mangel-wurzel, or field beet, will be taken first.

THE MANGEL-WURZEL, OR FIELD BEET (*Beta vulgaris*).

Where it can be successfully grown, the mangel deserves to rank as one of the most important fodders that can be included in a cropping rotation. When first introduced to Great Britain (1786) it was known, from its German

name, as "The root of scarcity," probably because it withstands dry seasons and produces heavy crops when others fail, or it may have been on account of its wonderful keeping qualities, which permit of it being stored and held in reserve till the spring and early summer, when there is generally a shortage of rich, nutritious feed.

It belongs to the same natural order of plants (*Chenopodiaceæ*) as the sugar-beet, beetroot, silver-beet, and spinach, and is closely allied to our native saltbushes (*Atriplex*) and the well-known weed goose-foot, or fat-hen. In its wild state it is still found as a seaside plant in temperate regions, and although it has been continuously selected and cultivated for generations as a field crop it still retains many halophytic characteristics, as will be seen later. The basis of selection has always been the external appearance of the root, practically no attention having been given to chemical composition; whereas in the case of the sugar-beet greater emphasis has been laid on the sugar content of the juices than on the size and shape of the roots.

Varieties.—As the natural corollary to the method of selection by external characters we have a number of varieties on the market showing differences in size, shape, and color.

- (a) Globe shaped. Orange, yellow, and red varieties.—These are best suited for the lighter and shallower types of soil, and also for the very stiff and heavy soils. The orange and yellow globes are very nutritious, and are regarded as the best kinds for early feeding.
- (b) Tankard or oblong shape. Golden and crimson varieties.—These are noted for their high feeding qualities. They are medium croppers, and good keepers. They are yellow fleshed, whereas the globes are mostly white fleshed.
- (c) Intermediates. Orange, yellow, and red varieties.—They are intermediate in shape between the tankards and the long mangel types.
- (d) Ox-horn shape. In these the roots grow like a twisted horn. They are heavy croppers and affect shallow soils, but the habit of growth is apt to interfere with intertillage.
- (e) Long-rooted. Red and yellow varieties.—These are the heaviest croppers, yielding under favorable conditions up to 100 tons per acre. The long yellow is said to be the more nutritious, but they are both rather coarse and fibrous. They are suited for the deep loams and clays, and stand well out of the ground. In keeping qualities they are unsurpassed, and in consequence are generally held back for summer use.

In recent years a new variety, known as the half-sugar mangel, has been put forward, but it is doubtful if it is any richer than the ordinary types. It was obtained by crossing the mangel with the sugar-beet, and the mangel, with its longer ancestry, would appear to have been too prepotent to allow of the transmission of the artificial characters of the sugar beet.

Professor Wood, of the University of Cambridge, published a paper about nine months ago on "The Feeding Value of Mangels," and in it he describes a series of experiments designed to test the relative feeding values of (1) yellow globes and long reds, (2) golden tankards and long reds. The results went to show that the feeding value of the long reds was about 16 per cent. better than the yellow globes, whereas there was practically no difference between the tankards and the long reds. These conclusions, as will be seen from the appended table, appear to indicate that the feeding values are proportional to the percentages of dry matter the roots contain. The following figures are taken from the above paper :—

TABLE I.—*Showing Yields.*

	Roots per Acre. Tons.		Dry Matter. Per cent.		Dry Matter. Per Acre. Tons.
White-fleshed globe	29.9	..	10.7	..	3.2
Golden tankard.....	24.6	..	13.1	..	3.2
Intermediate	27.4	..	12.0	..	3.3
Long red.....	29.9	..	13.1	..	3.9

Influence of Climate.—Mangels occupy the land from six to seven months, and during that time they develop a deep penetrating tap-root and an extensive system of feeding roots that search the deeper layers of soil and subsoil, and have been known to cause a blockage in tile drains 4ft. and even 5ft. below the surface. When once they get a proper start, therefore, mangels can withstand comparatively dry seasons, and are much less dependent on summer rains than the shallow-rooting turnips and swedes. They can also endure higher temperatures, and are grateful for warm, sunshiny weather.

As seedlings they are very delicate, and succumb readily to spring frosts and rough, cold weather. It is this weakness that chiefly determines the limits of cultivation of this valuable crop. Again, at harvest time the susceptibility of the mangel, when lifted, to autumn frosts is a drawback which must not be lost sight of.

Influence of Soil.—Mangels develop a very large leaf surface, and through their wide rootage area they feed voraciously on the elements of fertility in the soil. It is essential, therefore, that an unusually large amount of immediately assimilable plant food be provided in the land to furnish the raw materials required by the leaves. Unless the soil be in high condition it is impossible for the leaves to manufacture the amount of dry matter necessary for full development, and the yield is reduced. It follows, then, that the mangel does best on deep, strong, rich soils, and is not adapted for the light, thin, brashy lands that suit turnips. On alluvial flats and volcanic soils enormous crops of mammoth long reds can be grown. On strong clays and clay loams the shallow-rooting forms are preferable.

The point to be borne in mind is that mangels want good soils and liberal treatment. They are in one sense a very exhausting crop, since they are carted off the land and fed at the steading or in the grassfields. When mangels are sold off the farm as roots, the exhaustion is a very real one, and such practice is universally condemned. Where they are fed to stock and the manure is either dropped in the fields or subsequently carted on to other paddocks it is a case of enriching one field at the expense of another. Since mangels are never grown in blocks much larger than 15 acres or 20 acres, and in consequence of the heavy charges for haulage of dung and roots, it frequently happens that a small field near the farm buildings is definitely set apart as a mangel paddock and sown to this crop year after year. In this case mangels will prove a renovating crop, for most of the manure will find its way back, and it will contain the residues of the hay or straw and grains fed in conjunction with the roots, as well as the refuse of the mangels.

The establishment of a permanent mangel paddock is rendered possible by the fact that when liberally and judiciously manured land never becomes "sick." This may possibly be explained by the widely spreading root system and the freedom of the crop from attacks of insect and fungoid enemies. Where possible, however, it is better to move the crop round the farm, as it leads to a mellowing of the land that is beneficial to succeeding grain crops; and, again, the farmyard manure is not being put to best use when it is invariably distributed over the same acres. On really stiff, tenacious clay it may be well to grow mangels for a few years in succession on the same land, as the accumulation of dung and the constant working of the land will make the soil more open and friable and better suited to the production of heavy yields. In this connection it may be well to mention that on the heavy Rothamsted clay soil the twenty-fifth crop of mangels in continuous succession gave the highest yield obtained during the period 1876 to 1900.

Preparation of the Land.—In considering the preparation of the seed bed it is well to remember that mangels are the earliest sown of all the spring crops, and that there is generally insufficient time available for the proper fitting of the land at seeding unless the work has been thoroughly carried out in the autumn. This becomes all the more important when, as is usually the case, strong land is selected for the mangel break. Every effort should be made to get the land thoroughly opened up in the autumn so as to expose it to the ameliorating influences of the winter frosts, and, if possible, the dung should be worked in at the same time so that the spring tillage may be reduced to a minimum.

The system of tillage to be adopted will depend mainly on the character and condition of the soil, on the nature of the preceding crop, and on the climatic conditions; but it is a cardinal principle in the cultivation of the mangel to work up the land whilst relatively dry in the autumn, and subse-

quently to let it lie in a strong furrow through the winter months. *Mangels* are commonly taken after a cereal though they may follow lea or roots.

Mangels after a Grain Crop.—If the stubble be clean, long dung may be carted and spread, and the land ploughed up as deep as the nature of the soil will permit. At the end of July or early in August it should be cross-ploughed or double-disked and then worked over with a spring-tooth cultivator and harrowed to a seed bed. In a dry year it may be necessary to let the cultivator in fairly deeply in order to gain a moist surface, but at other times the harrows alone may prove sufficient.

In wet districts advantage is sometimes taken of the stubbles being clean to grow a catch crop, rye or vetches, with the object of saving the nitrates from leaching and at the same time of enriching the mangel seed bed. As soon as the vetches are off, the land is at once shallow-ploughed, disked, and harrowed.

When the stubbles are known to be foul they should be skim-ploughed or disked and harrowed in March or early in April, so as to get a good germination of weeds with the first rains. The disc-harrows or cultivator can be employed to clean the land; and in order to get the land as free from weeds as possible the deep ploughing may be delayed till the end of June. The mangel, being tardy in its germination and of slow growth in the first stages, it is of the utmost importance that the seed bed should be clean and well prepared.

Mangels after Lea.—This is not as good a rotation as the preceding one, as a good growth of useful autumn feed may have to be sacrificed, and where lambs are dropped in the months of April, May, and June this becomes a serious consideration. The presence of a large amount of vegetable matter is likely to improve the mangel crop, provided it is turned under in the autumn and thus given an opportunity of breaking down into humus. Grass lands should be skimmed to encourage rotting of the sward and then ploughed full depth about a month later. One objection to sowing mangels after lea is the difficulty of getting the plough to go deep enough at this time of the year. The spring working will be similar to that given in the case of stubble land, except that the cross-ploughing or double-disking may usually be dispensed with.

Mangels after Roots.—This is only likely to be practised where mangels are continuously grown on the same block, and as the roots are out of the field by the middle of June, or thereabouts, there will be ample time to clean up the rubbish and give the land a good stiff furrow. The timing of the spring working will depend on the nature of the land and the prevalence of late frosts. In some parts it will be a matter of waiting till the land will carry the teams, and farmers in these localities will be forced to realise the paramount importance of autumn cultivation. The question of subsoiling naturally arises in regard to these water-laden soils, and, although it is rather

expensive, I am inclined to think it would be well worth while trying an acre or two as an experiment. When the spring rains are as heavy and continuous as they have been during the last two seasons seeding is so long delayed that the roots have hardly time to reach the deeper layers before the advent of summer. By subsoiling in the autumn the clay would be broken, the land would dry more rapidly between the early spring rains, and the chances of a satisfactory September seeding be increased.

Manures and Manuring.—As already indicated, the mangel responds well to liberal treatment, and it is not difficult to understand this when attention is drawn to the average composition of the crop. In the following table is shown the number of pounds of nitrogen, phosphoric acid, and potash removed per acre by a 22-ton crop:—

TABLE II.—*Showing Average Composition in Pounds per Acre.*

	Nitrogen.	Phosphoric Acid.	Potash.
Roots	98	.. 36.4	.. 222.8
Leaves	51	.. 16.5	.. 77.9
	—	—	—
Total	149	.. 52.9	.. 300.7

It is obvious from these figures that the mangel is a greedy feeder. It abstracts from the soil about two and a half times as much phosphoric acid, nearly three times the quantity of nitrogen, and, roughly, seven to ten times as much potash as a 40-bushel crop of barley or 45 bush. of oats. Clearly, then, it is useless to expect to grow mangels successfully unless you are prepared to spend money on manure. Some knowledge, however, is required to lay out the money to the best advantage.

In the first place, it should be recognised that no other farm crop is so responsive to dung as the mangel; and, although under our conditions only small quantities of it are available, yet so valuable is it for this purpose that every care should be taken to save enough to give a dressing of at least 5 tons or 6 tons per acre. From 10 tons to 14 tons may be regarded as a good dressing. At Rothamsted the effect of 14 tons, without the addition of artificial fertilisers, was to increase the yield to about four times the amount obtained from the unmanured plot. After 28 years' experience at the above station the conclusion arrived at was that "a liberal dressing of farmyard manure forms the best basis of the manure for mangels." It is not to be supposed, however, that mangels cannot be successfully raised without it. On the contrary, very good crops may be grown with artificials alone, and if the full cost of the yard manure be charged against it there will be very little difference in the expenditure on fertilisers. The physical effects of the dung are advantageous, and, moreover, crops that have been well dunged are generally found to be healthier and hardier than those not so treated.

Of the artificial fertilisers those rich in nitrogen and potash are of importance to this crop. Phosphatic manures, except when no dung is available, are not required to any extent, as the mangel is naturally a slow-growing plant at first, and most soils are able to satisfy its moderate demands. Where very heavy dressings of dung are used the addition of phosphoric acid is without effect; but with half dressings it is as well to apply from 1cwt. to 1½cwt. of 36/38 superphosphate per acre. With reference to the nitrogenous manures, it has been shown that the crop increases with each application of nitrogen up to 180lbs. per acre. The addition of a quarter of a ton of nitrate of soda to the dung gave an average increase of 6 tons over the plot receiving farmyard manure alone.

It is not wise to over-stimulate the mangel with excessive quantities of nitrogen, as it has a tendency to "bolt" into heavy leaf at the expense of the roots, and the crop takes longer to mature. This difficulty can be overcome to some extent by applying the nitrogenous manure in two or three doses, but this means extra labor and additional expense. Nitrate of soda is more effective on mangels than any other form of nitrogenous fertiliser. Its superiority over sulphate of ammonia in this respect is due to its solubility, which enables it to sink quickly through the soil and reach the deep-feeding roots, whilst the ammonium sulphate is retained in the surface layers and is slowly made available as the weather gets warmer. With full dung dressings about 1cwt., and with, say, 7 tons to 8 tons an application of from 1½cwt. to 2cwt. of nitrate of soda should be sufficient.

The enormous amount of potash removed from the soil by the roots and tops of mangels would lead one to suppose that potash was likely to have a prominent place in the manurial formula. A. D. Hall, Director at Rothamsted, has set out the position in relation to potash very clearly in the following terms:—"A free supply of potash is essential to the proper development of the mangel; hence a specific potash manuring is desirable even when dung is used in large quantities, and on a strong soil initially rich in potash. When nitrogenous manures are used in addition to dung, the potash salts should be increased *pro rata*, in order to maintain the health and feeding value of the crop, and to bring it to maturity." Allowing that this generalisation, which was drawn from the records of 28 years' experiments, is equally applicable to our South-Eastern lands, much benefit should be felt from the use of heavy dressings of potassic fertilisers. The use of large quantities of dung will lessen the need for potash manuring to some extent, but on the lighter and more sandy soils good results should follow the application of kainite or sulphate of potash. With heavy dung dressings up to 1cwt. of kainite may be employed and, with half the amount, from 1cwt. to 2cwt., according to the quantity of nitrate of soda used.

As a source of potash, kainite is preferable to either the sulphate or muriate of potash on account of its salty nature. About a third of it is common salt,

and the mangel has retained in some measure the salt-loving properties of its wild prototype, the *Beta maritima*. The ash of the mangel contains over 50 per cent. of common salt, and it is therefore important to see that the soil is well supplied with this ingredient. Near the seacoast there is no need to consider this matter, but further inland it is a common practice to use seaweed, kainite, or salt, separately or in combination. The drier the district the more likely is the crop to respond to these saline dressings, for the effect of a plentiful supply of salt on the mangel is to render the leaves more turgid and fleshy, and to diminish transpiration. It is of interest to note that although cereals are destroyed by solutions containing from 1 per cent. to $1\frac{1}{2}$ per cent. of chloride of sodium, the halophytes are able to resist 3 per cent. to 4 per cent. solutions. Up to 5cwts. of salt are applied in England, but where kainite is used to supply the potash probably $1\frac{1}{2}$ cwts. to 2cwts. would be sufficient in the South-East.

When no farmyard manure is to be had it will be necessary to increase all the above quantities of artificials. Under these circumstances a useful mixture would be—2cwts. to 3cwts. of superphosphate or dissolved bones; 2cwts. to $2\frac{1}{2}$ cwts. of nitrate of soda; 2cwts. to 3cwts. of kainite; and 2cwts. to 3cwts. of common salt.

If the stable manure is available in the autumn, it should be carted out and ploughed under in May or June, when the deep furrow is being turned. At this time of the year long, strawy dung may be used; but if, through pressure of work or heavy autumn rains, the manure hauling is delayed till the spring, preference should be given to short, well-rotted dung, and the furrow should be no deeper than is necessary to cover it. When the crop is to be raised on ridges, the land is first ploughed and cleaned and then set up in drills. Sometimes the bottoms of the furrows are then loosened with a special implement. The dung is next spread in the hollows and the crowns split over it to form new ridges, which are allowed to lie through the winter. Land thus treated needs only a light harrowing and a cleaning of the furrows to fit it for the drill in the spring. If part or all of the dung is to be applied in the spring, the soil is first deeply stirred with the cultivator, raised into drills, dung spread, and then closed up again with the double mouldboard plough and drilled.

The superphosphate of lime, kainite, and a portion of the nitrate of soda may be sown with the seed, and where a water drill is used the two latter may be dissolved in the liquor. The salt and the remainder of the nitrate, however, are better held back for broadcasting about November, or perhaps a little earlier in the drier districts. By dividing the stimulating fertiliser into two parts in this way the danger of leaching is guarded against, and the balance of growth is not upset. When used as a top-dressing the nitrate should be broken down to powder before mixing with the salt.

Sowing Methods.—Mangels are either sown on the flat or on the ridge. In dry districts the former is safer, as there is less surface exposed and consequently less evaporation. The crowns of the ridges become very dry when the spring rains are scanty and the germination suffers. Sowing on the ridge takes up more time; but where the seasons justify the adoption of the system and the work is well forward it should always be preferred. When the seed is drilled on ridges the horse-hoe can be used sooner, as there is less risk of smothering the young plants; this is an important matter if the weeds are getting away. Again, the thinning of the crop is made easier, the roots are left higher out of the ground at harvesting, and in the case of strong clays the surface is more readily worked down into a seed bed than when the "flat" method is followed. Probably in the Mount Gambier and Millicent districts and round about Penola and Kalangadoo the land might be ridged, but further north it would be better practice to sow on the flat.

The seed should be drilled in rows from 28in. to 32in. apart; the shorter distance is better for the luxuriant long reds, and the wider rows for the globes and tankards. It is wiser to aim at the production of average-sized roots than a reduced number of abnormally large ones. They may be sown through the ordinary farm drill in admixture with ashes or manure, or special mangel drills may be employed. The one in use on the Kybybolite Farm is known in New Zealand as "Bristowe's Patent," and consists of a flat circular brass box, one side of which carries a series of short projecting studs. It is simple and is easily regulated. In moist localities a water drill is sometimes used with the object of hastening germination; dry sowing, however, is more likely to succeed in these parts. When the ridge and furrow method is adopted a special ridge-drill will be required.

The mangel "seed" is really a fruit containing three or more true seeds. The outside husk is of a very tough woody nature, and to this is due the slowness of germination. If dry weather supervenes on seeding the mangel seed may lie in the ground for weeks together before showing through. Some farmers make a practice of softening this hard capsule by soaking the seed in cold water for 24 to 36 hours or in liquid manure or warm water for 12 hours before sowing. The seed is then strained and dried on a floor or tarpaulin, or mixed with powdered charcoal. The objection to the practice is that seeding may be delayed and the steeped seed may get heated, or again the season may turn out to be a dry one, in which case the soaked seed would suffer more than the untreated.

Unfortunately, we cannot at present hope to reduce the quantity of seed per acre low enough to obviate the necessity for hand thinning. As stated above, the capsule contains three or more seeds, and of these two are usually fertile. Mangel "seed," in consequence, should show a germination test of at least 150 per cent., and it is as well to see that good sound seed is purchased, as even with high-class samples it is not always an easy matter to,

get a satisfactory "strike." The United States of America Department of Agriculture have been endeavoring to secure a single germ type of mangel, and five years ago announced that they had a strain that bore 26 per cent. of one-seeded capsules. Final success, however, has apparently not yet been attained. In general from 3lbs. to 4lbs. per acre will be found sufficient, unless the soil is apt to settle into hard crust, or there is likely to be much loss from the ravages of birds. To guard against these conditions an extra pound per acre may be drilled.

The best time to sow mangels is in September, or as soon as severe frosts are past. The earlier they can be got in with safety the better, but it is not wise to risk a keen frost with such a susceptible plant at the mangel. When the crop has been preceded by a catch crop of vetches or rye it may not be possible to get the seed sown before the end of October, but it would not be good policy to delay much later than that.

Mangels are acknowledged to be a very fickle crop in the early stages of growth, and it is therefore the more necessary to have the seed bed in fine tilth. The seed must not be buried more than half to three-quarters of an inch or it will not germinate, for it must not be overlooked that, although the capsules are a fair size, the true seeds are very small. When difficulty has been experienced in cleaning the seed bed it may be as well to postpone drilling till the weather begins to get warmer in order to give the young plants a better chance. Weeds grow apace even in the winter if the season be an open one, and if a spell of cold weather follows immediately on seeding they will rapidly overtake the slower-growing mangel seedlings and choke them out. As a general rule, however, it may be said to be good practice to sow as soon as a fine enough tilth can be secured.

The system of raising young plants in specially prepared beds and then transplanting when a few weeks old is still used where the mangel fly (*Anthomyia betæ*) is prevalent, but it is not applicable here.

(To be continued.)



ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the above Board was held on Wednesday, June 14th, 1911, there being present Messrs. J. W. Sandford (Chairman), G. R. Laffer, J. Miller, C. J. Tuckwell, C. J. Valentine, Col. Rowell, G. Jeffrey, C. Willcox, A. M. Dawkins, and Professor Perkins.

The Hon. Minister intimated that, in accordance with the request of the Board, arrangements had been made for the publication in the *Journal of Agriculture* of a series of articles by the veterinary staff on common ailments of stock.

PIGS FOR EXPORT.

The subject was introduced by Mr. A. M. Dawkins, who referred to the glut in the pig market and the extremely low prices that had been ruling lately. He thought, perhaps, the trouble could be overcome by establishing an export trade, and suggested that the Government should give a bonus as a stimulus, as had been done in connection with the butter export business, until it was able to proceed alone. The Chairman said the cause of the low prices was not so much that supplies in South Australia were greatly in excess of demands as that the rates ruling in the eastern States, which were big pig-producers, were lower than they had been for years. Unless the supplies were likely to be continuous he did not think it would be advisable to attempt to open up an export trade with Great Britain. The Secretary (Mr. W. L. Summers) said he understood several small shipments had been made from the Produce Depot at Port Adelaide within the last six months, and had returned the shippers 4d. a pound net. Early in the year the Victorian department had forwarded a shipment to England, which had netted 4d. per pound at Melbourne. The Chairman believed that if a regular supply of cured bacon of the quality, class, and cuts required could be sent to England it might be possible to make a success of the hog export trade. He did not think it would be wise, however, to simply slaughter the hogs and send the pork along, as he had been assured very little of it would be utilised in that state. Personally he looked forward to the day when Australia would supply large quantities of the cured article to the English market. Mr. C. J. Tuckwell was satisfied that the industry could be worked up, and if it could be stimulated by giving a bonus that would be a good course to adopt. Mr. Laffer said he had been about the country a lot, and could assure members that many pig-owners were thoroughly disheartened at the state of affairs; indeed, some had indicated their intention, if the market did not improve soon, to materially reduce their stocks.

He thought the Government could help the industry by undertaking curing in connection with the Depot at Port Adelaide on the same basis as was done with lambs. Mr. G. Jeffrey felt it would not be advisable to ask the Government to give a bonus, but saw no reason why it should not adopt the idea advanced by Mr. Laffer—help the pig industry on the same lines as the lamb export trade had been assisted. Mr. C. J. Valentine considered that the industry would be best fostered by working on the co-operative principle. Eventually it was decided, on the motion of Mr. Dawkins, seconded by Mr. Laffer—"That the Government be asked to make careful inquiry with a view to ascertain whether the department cannot do something to assist in the development of an export trade in pigs and pig products."

RETIREMENT OF MEMBERS.

The Secretary intimated that as that was the last meeting of the year it was necessary to announce the retirement, in accordance with the rules, of Col. Rowell, Messrs. A. M. Dawkins, and G. Jeffrey, and the President of the Vinegrowers' Association.

ST. JOHN'S WORT.

Mr. Dawkins directed attention to the rapid spread of St. John's wort in Victoria, and suggested that the public should be made acquainted with the dangerous nature of the weed. It was decided to suggest that an illustration of the weed be published in the *Journal*.

NEW SECRETARY.

The Chairman read a letter from the Minister of Agriculture intimating that, owing to alterations in the department, Mr. Summers would not be able to continue after July 1st to act as Secretary to the Board. His duties would in future be carried out by Mr. G. G. Nicholls. The Chairman expressed keen regret at losing the former, and was sure his feelings would be endorsed by every member of the Board and the 120 Branches of the Bureau. Mr. Summers had proved exceptionally qualified to fill the position, and had displayed great tact in handling the Branches. It had been a pleasure to be associated with him. By his departure the Board would lose an exceedingly valuable officer. While sorry that he should leave them, they were glad that he was to be promoted. Several members of the Board spoke in similarly eulogistic terms concerning Mr. Summers, who voiced his appreciation of the sentiments. He found it far from pleasant to sever his official connection with the members of the Board, with some of whom it went back nearly 19 years. His work had been most congenial and as a matter of duty he had done all in his power to forward the aims and operations of the Board. Perhaps most keenly of all he felt the severance of his direct connection with the Agricultural Bureau.

THE HARVEST OF 1910-11.

WHEAT AVERAGE, 11·57 BUSHEL8.

The Government Statist (Mr. L. H. Sholl) has published the final results of the last harvest of cereal, hay, and fodder crops in South Australia. For our main crop—wheat—the return has been eminently satisfactory, being 24,344,740bush., taken off 2,104,717 acres, or an average of 11·57bush. per acre. This is below the splendid average of 1909-10, which was 13·26bush. but it is above the average of the last five seasons (11·54bush.). Last winter was exceptionally wet; too wet, indeed, for most of the country within the rainfall line, but well suited to produce big results in the usually dry north and east. It is the good yields from the hundreds beyond Goyder's line which have helped to save the situation and bring about such a satisfactory average. The mean approximate rainfall was as follows:—

Year.	Total all Counties.	Divisions.				
		I. Central.	II. Lower North.	III. Upper North.	IV. South- Eastern.	V. Western.
1910.....	Inches. 20·06	Inches. 24·21	Inches. 19·74	Inches. 15·12	Inches. 25·08	Inches. 16·17
Mean for 5 years	17·12	20·18	16·20	13·12	22·43	13·86

The effect of the very wet winter will be seen by comparing the average returns for the past two years in a few wet counties with the returns from some of the dry counties.

Wet Counties.

	Average Yield in Bushels.	
	1909-10.	1910-11.
Adelaide	14·39	10·51
Carnarvon (Kangaroo Island) ...	5·90	3·40
Gawler	16·87	12·59
Hindmarsh	13·41	7·82
Light	17·41	13·27
Victoria (Lower North)	16·49	14·04
Grey (Mount Gambier)	15·47	9·40

Dry Counties.

Kimberley	9·26	11·92
Granville	7·46	9·05
Herbert.....	6·85	13·63

The area reaped for wheat shows a substantial increase over the preceding year, the figures being 2,104,717 acres in 1910-11 and 1,895,738 acres in 1909-10. The total area under cereals in 1910-11 was 2,689,106 acres, and under wheat (both for grain and hay), 2,411,156 acres. The average return of wheaten hay per acre was 1.38 ton; the area reaped for the purpose being 336,439 acres, yielding a total of 464,048 tons. Barley of all kinds averaged 15.79 bush. per acre, as against 16.50 bush. in the previous year. The total oats reaped amounted to 1,136,618 bush., or an average of 14.63 bush. per acre. The season was an excellent one for peas, the yield of 188,786 bush. being a record for the State, and the average 19.61 bush. per acre. The results from each county will be published next month.

EXTRACTS FROM TRADE COMMISSIONER'S REPORT.

NOTTINGHAM GROCERS' EXHIBITION.

"This exhibition was opened by the Lord Mayor (Sir Edward Fraser, D.C.L.) on Wednesday, May 3rd, and closed on the 13th. The South Australian exhibit occupied 26ft. by 16ft., and consisted of lambs' tongues, wine, fresh fruit, and honey. The exhibition throughout has been quite up to the usual standard. The attendance has been extremely good, the average daily being 10,000. The grocers, not only from Nottingham, but from towns within 30 miles radius, have been very much in evidence. I think the invitation cards that I issued (at the expense of the exhibition authorities) had a good deal to do with the extra number of grocers who attended. Both Mr. Champion and myself were kept busy answering inquirers and giving information generally.

"In regard to wine, honey, and apples, we were in a position to inform inquirers where they might obtain stocks, and I am convinced excellent results will follow. I will give one instance. Mr. Joseph Armitage, of Armitage Bros., Ltd., the largest retail establishment in Nottingham, was so interested in what we had to say about South Australian produce that he instructed his buyer to immediately obtain a supply of all available lines and give up one of the largest windows in the principal shop solely to these goods. This will prove a further valuable advertisement for our State, particularly as the shop is right in the busiest part of the city. Unfortunately

the only lines I was able to get Mr. Armitage a supply of were apples, wine, honey, and tongues, although he badly wanted other lines, particularly dried apricots.

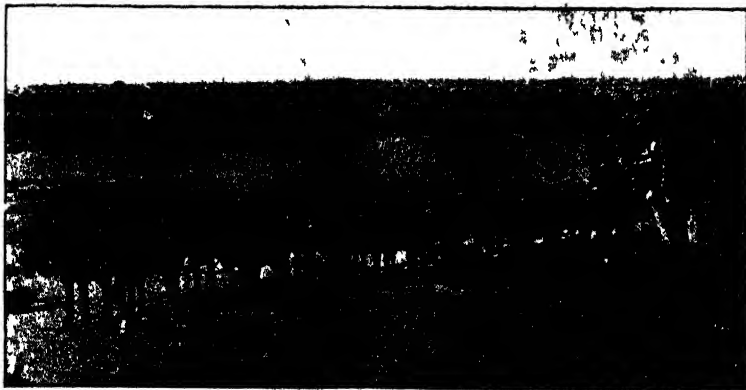
"When speaking about dried apricots it might interest you to learn that we had many inquiries apart from Mr. Armitage's, but in each instance I had to say that I was unable to state where the fruit could be obtained. We had no samples, although it is now well on in May."

CORONATION PRICES.

"Judging by some remarks made in regard to holding produce for the Coronation, it struck me that it might be thought that prices should be higher for food stuff, such as fruit and poultry, owing to the Coronation festivities. This is quite a mistaken idea, as has been proved on so many past occasions. The reason is this. The private consumer has so many other expenses on occasions such as these that money which is usually spent on such luxuries as poultry and fruit is expended on dress and amusements, and to meet the latter contingencies household expenses are kept down.

"I am basing this opinion on opinions gathered from the buyers of the leading stores in London, such as the Army and Navy Stores, Whiteley's, Harrods, etc. I thought it advisable to call your attention to this, because some of the shippers may probably imagine and rightly so too, that owing to the forthcoming festivities the demand for such goods as poultry and fruit would be greater.

"At the present time there is a big fight on in the American market, and the very best 'gilt-edged' American poultry can be purchased for 9d. per pound."



CARTING FIREWOOD IN THE INTERIOR.

THE WHEAT MARKET.

The only local change in the wheat market during June was a fall in the Port Adelaide price to 3s. 2d. a bushel on trucks, or 3s. 1d. at outports. In the early part of July there was a recovery to 3s. 3d.

Writing on May 26th, *Beerbohm's Evening Corn Trade List* says—"Last week's total exports to all countries of over 2,100,000qrs. constitute a record for the time of year, and make the total for the past two weeks 4,000,000qrs. The world's weekly consumption is about 1,525,000qrs., so that there has been an excess in the exports of the last two weeks of nearly 1,000,000qrs. These large exports confirm the general opinion that, taken as a whole, exporting countries still hold large quantities of wheat—quite sufficient to satisfy even the exceptionally large requirements of importing countries until the new crops become available, and, provided no serious mishap occur to any of the more important crops, the present level of prices will probably attract all the wheat required. The demand, as is only natural, after the very large trade put through a few weeks ago, has been exceedingly quiet. Stock are still reported to be quite moderate in all importing countries, and it seems pretty evident that the consumption—partly owing to the very poor potato crop in many countries last year—has been larger than anticipated. At the same time, if the growing crops in importing countries make seasonable progress the demand is not at all likely to continue on the immense scale recently experienced, as consumers, the nearer harvest-time approaches, will become more and more reserved. The course of prices will depend very much on whether the year's harvest is a late or an early one.

"There is no particular change in American crop prospects, and present indications are still for a much larger crop than in any previous year. The harvesting of winter wheat will soon be commencing, but spring wheat has several months to pass through before the crop can be considered at all safe. Last year the serious damage occurred in the month of June."

On June 2nd European crop prospects were reported as favorable, on the whole, and the latest reports from Russia showed that a great improvement had taken place during the previous fortnight, especially in spring wheat. The outlook for winter wheat in North America was not so good.

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
June 9	Dull ; March-April, 4/2 $\frac{3}{4}$	3/3	3/4 $\frac{1}{2}$	3/4
10	Quiet	Do.	Do.	Do.
12	Offers lower without response	3/2	Do.	3/3 to 3/4
13	—	Do.	3/4 $\frac{1}{2}$ to 3/5	3/3 to 3/3 $\frac{1}{2}$
14	Easier ; February-March, 4/2 $\frac{1}{4}$	Do.	Do.	Do.
15	Steady, but quiet	Do.	Do.	Do.
16	Steady ; March-April, 4/2 $\frac{1}{4}$	Do.	Do.	Do.
17	Liverpool firm ; April-May, 4/2 $\frac{1}{4}$	Do.	3/4 to 3/4 $\frac{1}{2}$	3/3 to 3/4
19	—	Do.	Do.	Do.
20	Dull ; February-March, 4/2 $\frac{1}{4}$	Do.	Do.	Do.
21	Firm, but not active	Do.	Do.	Do.
22	—	Holiday (Coronation)	Holiday	Holiday
23	Steady ; arrived wheat, 4/3	3/2	3/4 $\frac{1}{2}$	Do.
24	—	Do.	Do.	Do.
26	—	Do.	Do.	Do.
27	Quiet ; arrived, 4/3	Holiday	Holiday	Holiday
28	Steady, but quiet	3/2	3/4 $\frac{1}{2}$ to 3/5	3/3 to 3/4
29	Firm ; June-July, 4/2 $\frac{3}{4}$	Do.	3/5	Do.
30	Steady ; quiet	Do.	3/4 to 3/4 $\frac{1}{2}$	Do.
July 1	Do.	Do.	Do.	Do.
3	—	3/2	3/4	Do.
4	Firm ; May-June, 4/2 $\frac{1}{4}$	Do.	3/4 $\frac{1}{2}$ to 3/5	Do.
5	Firm ; rather dearer	Do.	3/5	3/3 to 3/3 $\frac{1}{2}$
6	—	Do.	Do.	3/3 to 3/4
7	Firm ; off coast, 4/3 $\frac{3}{4}$	3/3	Do.	Do.
8	Steady ; quiet	Do.	3/5 to 3/5 $\frac{1}{2}$	Do.

STEAMER FREIGHTS.—Steamers from South Australia to United Kingdom—Continent, full cargo rates 25s. per ton (8d. per bush.). Parcels, Port Adelaide to London-Liverpool, 23s. 9d. per ton (7 $\frac{3}{4}$ d. per bush.) ; to Continent, 25s. per ton (8d. per bush.) ; Port Adelaide to Melbourne, 8s. per ton (2 $\frac{1}{4}$ d. per bush.) ; to Sydney, 10s. 6d. per ton (3 $\frac{1}{4}$ d. per bush.)

SAILER FREIGHTS.—From South Australia to United Kingdom—Continent, 25s. to 26s. 3d. per ton (8d. to 8 $\frac{1}{2}$ d. per bush.) ; to South Africa, 20s. per ton (6 $\frac{3}{4}$ d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for June, 1911, at the undermentioned stations, also the average total rainfall for the first six months in the year, and the total for the first six months of 1911 and 1910 respectively :—

Station.	For June, 1911.	Av'ge. to end June.	To end June, 1911.	To end June, 1910.	Station.	For June, 1911.	Av'ge. to end June.	To end June, 1911.	To end June, 1910.
Adelaide	2.52	10.11	7.07	11.60	Hamley Bridge	2.12	8.02	6.97	10.31
Hawker	0.74	5.83	3.51	10.16	Kapunda....	2.82	9.11	8.13	11.38
Craddock	0.47	5.42	2.88	8.71	Freeling....	2.28	8.39	7.59	10.52
Wilson.....	0.47	5.83	2.46	10.73	Stockwell ...	2.35	9.32	8.78	10.80
Gordon	0.36	8.05	2.69	5.08	Nuriootpa....	2.28	9.80	7.19	11.08
Quorn	0.50	6.37	3.01	8.77	Angaston ...	3.48	9.82	10.83	13.34
Port Augusta	0.44	4.85	4.34	8.85	Tanunda.....	4.16	10.26	12.24	12.32
Port Germein	0.98	6.27	5.37	10.57	Lyndoch	3.84	10.41	9.21	12.14
Port Pirie ...	1.15	6.47	6.91	13.90	Mallala	2.61	8.24	6.88	9.07
Crystal Brook	2.10	7.17	7.48	10.79	Roseworthy .	2.49	8.33	6.68	11.06
Pt. Broughton	2.51	7.02	7.73	10.17	Gawler.....	2.33	9.15	7.39	11.91
Bute	2.82	7.27	9.06	12.50	Smithfield ..	2.59	8.26	8.03	11.98
Hammond ..	0.81	5.22	6.27	8.70	Two Wells....	1.90	8.37	5.88	9.66
Bruce	0.49	4.50	2.54	9.15	Virginia.....	2.01	8.64	6.91	10.76
Wilmington .	1.66	8.24	7.48	13.51	Salisbury....	3.25	9.03	9.19	13.41
Melrose	2.05	10.84	8.44	17.05	Teatree Gully	4.25	12.91	10.58	14.73
Booleroo Cntr	1.83	7.32	5.11	10.74	Magill	4.01	12.77	10.23	11.70
Wirrabara... .	1.94	8.67	6.09	13.44	Mitcham ...	3.40	11.60	9.09	11.20
Appila	1.52	6.86	6.18	13.66	Crafers.....	9.26	21.79	21.58	24.45
Laura	2.08	7.90	7.41	14.64	Clarendon ...	5.70	16.13	15.50	14.25
Caltowie	2.48	7.63	8.48	10.83	Morphett Vale	2.76	11.45	9.92	11.33
Jamestown... .	2.85	7.59	9.21	9.34	Noarlunga... .	2.52	9.84	10.36	10.05
Gladstone ...	2.60	7.06	8.33	10.68	Willunga	3.68	12.22	13.68	13.94
Georgetown .	2.77	8.50	8.68	10.58	Aldinga	2.63	10.11	9.00	10.60
Narridy	3.80	7.95	8.68	10.01	Normanville..	3.51	10.00	9.61	11.84
Redhill	2.58	7.77	7.34	13.88	Yankalilla... .	4.23	11.51	11.31	17.46
Koolunga ...	2.37	7.31	7.22	12.81	Eudunda.....	2.01	7.77	7.83	14.65
Carrieton ...	0.62	5.52	3.82	11.67	Sutherlands .	1.07	—	5.03	8.96
Eurelia	0.72	5.99	4.57	10.56	Truro.....	2.22	8.74	8.73	12.02
Johnsburg ..	0.33	4.41	3.20	9.07	Palmer	1.22	—	5.77	10.22
Orroroo	0.73	6.59	3.83	9.16	Mt. Pleasant.	3.33	12.47	11.19	13.11
Black Rock.. .	0.89	5.80	4.95	9.74	Blumberg	4.01	13.93	11.55	13.79
Petersburg ..	0.83	6.04	5.94	8.31	Gumeracha... .	5.06	15.42	14.35	15.52
Yongala	1.26	6.23	5.96	8.29	Lobethal	5.59	16.46	14.92	16.04
Terowie	0.95	5.95	5.99	11.40	Woodside	4.20	14.26	14.05	17.37
Yarowowie ...	1.30	6.18	6.55	11.06	Hahndorf ...	5.06	16.03	17.87	29.00
Hallett	2.01	7.25	7.14	8.81	Nairne.....	3.35	13.27	16.27	16.99
Mount Bryan	1.38	7.01	6.32	9.88	Mt. Barker ...	4.27	13.91	15.34	16.68
Burra.....	1.99	8.10	8.08	12.09	Echunga ...	4.90	15.32	18.01	20.01
Snowtown... .	1.98	7.38	5.54	10.90	Macclesfield .	4.21	13.40	15.34	18.18
Brinkworth... .	2.19	7.05	7.24	11.47	Meadows	5.52	16.24	18.35	20.91
Blyth.....	2.64	7.77	7.44	9.43	Strathalbyn .	2.20	8.76	10.13	12.29
Clare	4.51	11.11	11.18	15.00	Callington ...	1.18	7.15	7.19	9.61
Mintaro Cntrl.	3.01	9.93	9.71	12.81	Langhorne's B	1.52	7.06	6.74	8.61
Watervale... .	3.49	12.72	12.03	13.23	Milang.....	0.93	8.24	5.09	6.97
Auburn	3.48	11.08	11.23	13.86	Walleroo ...	3.15	7.12	8.43	9.91
Manoora	2.44	8.34	7.12	10.94	Kadina	2.50	7.94	7.34	9.75
Hoyleton	2.24	8.80	8.62	8.44	Moonta	2.27	7.81	6.77	7.84
Balaklava... .	1.79	7.81	7.79	9.98	Green's Plns..	1.85	7.53	5.85	9.26
Pt. Wakefield	1.56	6.82	6.83	7.96	Maitland....	3.29	9.87	10.20	8.14
Saddleworth..	2.36	9.48	7.42	11.06	Ardrossan... .	1.95	6.87	6.86	7.12
Marrabel....	2.01	8.95	6.18	10.84	Pt. Victoria..	3.09	7.68	8.79	7.70
Riverton....	2.95	9.64	9.05	13.96	Curramulka .	2.74	8.82	8.15	10.42
Tarlee	2.00	8.31	6.90	10.96	Minlaton....	2.01	8.48	7.45	10.29
Stockport ...	1.84	7.70	5.88	8.24	Stansbury ..	2.36	8.07	8.30	9.42

RAINFALL TABLE—*continued.*

Station.	For June, 1911.	A'ge. to end June.	To end June, 1911.	To end June, 1910.	Station.	For June, 1911.	A'ge. to end June.	To end June, 1911.	To end June, 1910.
Warooka....	2.70	8.23	9.94	10.04	Bordertown .	2.61	8.96	8.04	9.56
Yorcktown .	1.95	8.34	8.23	9.77	Wolseley....	2.56	8.00	8.37	9.79
Edithburgh..	2.17	8.07	7.00	16.99	Frances.....	3.59	8.67	11.03	10.21
Fowler's Bay.	2.07	6.55	5.87	4.09	Naracoorte .	4.02	10.05	11.38	11.98
Streaky Bay.	2.59	7.70	8.39	6.64	Lucindale ...	5.49	10.28	12.92	14.72
Pt. Elliston..	4.58	8.00	9.44	6.26	Penola.....	3.97	11.92	13.88	15.50
Pt. Lincoln..	3.89	9.50	8.76	7.93	Millicent	5.52	13.77	18.05	14.77
Cowell	1.56	5.86	6.25	7.33	Mt. Gambier.	4.64	14.18	17.77	16.12
Queenscliffe .	—	18.92	—	16.27	Wellington ..	1.96	7.28	7.05	10.36
Pt. Elliot....	2.18	9.89	8.06	9.76	Murray Bridge	1.26	6.75	5.85	12.30
Goolwa	1.85	8.47	9.03	10.01	Mannum ...	0.59	5.83	3.33	10.72
Meningie....	2.38	8.92	7.56	8.94	Morgan	0.31	4.35	4.47	6.40
Kingston....	3.95	11.70	11.70	13.92	Overland Crnr	0.49	5.44	6.70	9.60
Robe	4.18	—	13.43	14.20	Renmark ...	6.24	4.89	6.59	8.15
Beachport... 5.75	13.05	16.54	13.58		Lameroo ...	—	—	—	—
Coonalpyn ..	2.89	7.91	8.05	8.30					

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on July 1st—

BUTTER.

Owing to the cold and wet weather experienced during the month, the supply of cream was not so good as previously, and in consequence the price of butter has increased. During the latter portion of June there has been an improvement in the supplies, and the outlook is promising. The present prices are as follows:—Superfine, 1s. 5d.; pure creamery, 1s. 2d.

Messrs. A. W. Sandford & Co. report on July 1st:—

BUTTER.—Very substantial business continues to be put through. Best factory and creamery, fresh in prints, 1s. 1½d. to 1s. 3d.; second grade factories, 11d. to 11d.; choice separators, dairies, 1s. to 1s. 1d.; medium quality lots, 9½d. to 10d.; stores and collectors', 8½d. to 9d. per lb.

EGGS.—The run down in values in this line has been only gradual, owing to the active sales experienced; prime, guaranteed new-laid hen, 1s. 4d.; duck, 1s. 5d. per dozen.

CHEESE.—Good turnover for mild-flavored new makes at 5½d. to 6½d.; off conditioned lots down to 3d. per lb.

BACON.—Factory-cured sides selling readily at 6d. to 7½d.; middles, 7d. to 8d. per lb.

HAMS.—In calico, 8d. to 8½d. per lb.

LARD.—In skins, 6d., bulk, 5½d. per lb.

HONEY.—Prime clear extracted, very scarce at 2½d.; beeswax, 1s. 2d. per lb.

ALMONDS.—Soft shells, Brandis, 6½d.; mixed soft shells, 6d.; hard shells, 2½d.; kernels, 1s. 1½d. per lb.

LIVE POULTRY.—Excellent demand experienced throughout the month: good table roosters, 2s. 9d. to 3s. 3d. each; plump cockerels, 2s. to 2s. 6d.; hens and light cockerels, 1s. 6d. to 1s. 9d.; ducks, 2s. 6d. to 3s. 6d.; geese, 3s. 6d. to 4s. 6d.; pigeons, 7d.; turkeys, 7d. to 10d. per lb. live weight, for fair to good table birds.

POTATOES.—Gambiers supplying local market at £3 7s. 6d. to £3 12s. 6d. on trucks, Adelaide or Port, per ton of 2,240lbs.

ONIONS.—Forwardings from Hills districts getting lighter; consequently Gambiers have appreciably advanced. Locals, £3 10s. to £4, Adelaide; Gambiers, £3 15s. to £4 on trucks, Adelaide or Port, per ton of 2,240lbs.

AGRICULTURAL BUREAU REPORTS. **INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.**

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		July.	Aug.			July.	Aug.
Amyton	*	—	—	Millicent	1215	11	8
Angaston	*	8	5	Miltalie	1202	8	5
Appila-Yarrowie	1187	—	—	Minlaton	*	15	12
Arden Vale & Wyacca	1180	10	—	Mitchell	1202	8	12
Arthurton	1197	—	—	Monteith	*	—	—
Balaklava	*	8	—	Moonta	*	—	—
Beetaloo Valley	1158	—	—	Morchaid	1182	—	—
Belalie North	*	8	5	Morgan	†	8	5
Blyth	1193	11	8	Morphett Vale	*	—	—
Bowhill	*	—	—	Mount Bryan	†	8	5
Bowmans	*	6	10	Mount Bryan East ..	†	8	5
Bute	1198	—	—	Mount Gambier	1215	8	—
Butler	†	—	—	Mount Pleasant	1211	14	11
Caltowie	*	8	5	Mount Remarkable ..	†	5	9
Carrieton	1180	6	10	Mundoora	†	—	—
Cherry Gardens	*	11	8	Murray Bridge	*	—	—
Clare	1193	7	4				
Clarendon	*	10	7	Nantawarra	1195	5	9
Colton	†	8	12	Naracoorte	1216	8	12
Coomooroo	1180	10	—	Narridy	1188	—	—
Coonalpyne	†	—	—	Northfield	1196	11	8
Craddock	†	—	—				
Crystal Brook	†	—	—	Parrakie	1207	29	5
Cummins	†	8	5	Paskeville	1199	6	10
Davenport	1181	—	—	Penola	*	1	5
Dawson	—	—	—	Penong	†	8	12
Dingabledinga	1209	14	11	Petina	*	—	—
Dowlingville	1198	—	—	Pine Forest	1199	11	8
Elbow Hill	1199	—	—	Port Broughton	1188	14	11
Forest Range	†	6	10	Port Elliot	1212	15	19
Forster	*	—	—	Port Germein	1188	15	—
Frances	*	7	4	Port Pirie	1188	1	5
Freeling	1193	—	—	Quorn	1183	8	—
Gawler River	1194	—	—	Redhill	†	11	8
Georgetown	*	8	12	Renmark	*	—	—
Geranium	*	29	26	Saddleworth	1196	21	18
Green Patch	1200	17	7	Salisbury	1196	4	1
Gumeracha	*	10	7	Shannon	1203	—	—
Hartley	*	8	5	Sherlock	1208	15	12
Hawker	1181	10	7	Stockport	*	—	—
Hookina	1181	8	—	Strathalbyn	*	17	21
Kadina	*	6	10	Sutherland	*	—	—
Kalangadoo	1214	8	12	Tatiana	*	1	5
Kanmantoo	*	8	5	Uraidla and Summert'n	†	3	7
Keith	†	8	12	Utera Plains	1204	8	5
Kingscote	†	4	1	Waikerie	1208	—	—
Kingston	1214	29	26	Watervale	*	—	—
Koppio	1200	6	10	Wepowie	1184	—	—
Kybybolite	*	6	10	Whyte-Yarcowie	1191	8	5
Lameroo	1205-6	—	—	Willowie	1185-6	—	—
Lipson	1201	—	—	Willunga	1213	1	—
Longwood	1210	5	9	Wilkawatt	1209	8	5
Lucindale	*	15	—	Wilmington	1184	5	9
Lyndoch	*	6	—	Wirrabara	1187	—	—
Maitland	1198	1	3	Woodside	1213	12	—
Mallala	*	1	7	Yadnarie	1205	8	5
Mannum	*	29	26	Yallunda	*	—	—
Meadows	1210	10	7	Yongala Vale	1192	8	5
Meningie	†	8	12	Yorketown	1199	8	12

* No report received during the month of June.
† Only formal business transacted at the last meeting.

REPORTS OF MEETINGS.

Edited by W. L. SUMMERS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Arden Vale and Wyacca, June 12.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. M. and A. Eckert, Green, Whillies, O'Loughlin, and Hannemann (Hon. Sec.).

DESTRUCTION OF NOXIOUS WEEDS.—Members were of opinion that this question should have every consideration, as the star thistle in particular was spreading very rapidly. The Chairman spoke of the havoc the star thistle had wrought, and urged members to adopt every means to destroy it. It was resolved to approach the district council on the matter.

TAKEALL.—Speaking of this wheat disease the Chairman said that in his experience working the land in a dry state had favored the development of the disease.

Carrieton, June 8.

(Average annual rainfall, 11½in.)

PRESENT.—Messrs. Fisher (chair), Kaerger, Byerlee, Williams, Earle, Beerworth, Radford, and Bock (Hon. Sec.).

NOXIOUS WEEDS.—The Chairman stated that the stock route through the district was very badly infested with star thistle, the seed having, he believed, been brought from the south by travelling sheep. The weed was spreading very fast, and would become a serious trouble if not checked. It was resolved that the Crown Lands Department should be written to and requested to destroy the weeds on the stock road before September.

WHEATBUYERS' SCALES.—It was resolved that, in the opinion of members, all wheat-buyers' scales should be properly tested by an authorised officer, as in many cases the scales were unsatisfactory. It was also decided to suggest for discussion at Congress that the Government should be requested to provide weighbridges at railway stations to permit of wheat being weighed in bulk.

Coomooroo, June 12.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berriman (chair), Brown, H. and T. Avery, Hall, Brice, Robertson (Acting Sec.), and two visitors.

SHEEP ON THE FARM.—Some discussion took place on this subject. Mr. Pritchard considered lambs should be marketed before they reached the age of 12 months. The Dorset Horn cross was fast coming into favor. He considered that greasy wool sheep did not pay as well as the clean-woolled breeds. Mr. H. Avery thought it advisable to keep sheep on every farm, as they not only returned profit for very little labor, but they kept down the rubbish and did well on feed that was of little use to big stock. Mr. E. Hall preferred the pure breeds to the crossbreds, as the latter were not so good for wool production. Mr. Brown thought sheep for wool should be pure-bred Merinos; if for lamb-raising Merino ewes crossed with Shropshire rams. Mr. Hall preferred the Dorset Horn cross to the Shropshire, and members generally expressed the opinion that the Shropshire cross was the most difficult to keep inside the fences. Members generally agreed that it paid to keep sheep on the farm, and that only as many as could be kept in good condition should be stocked.

Davenport, June 5.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Bothwell (chair), Messenger, Bice, Gosden, Hobby, Sanderson, and Lecky (Hon. Sec.).

ANNUAL MEETING.—The Chairman presented a report, in which he stated that during the year 11 meetings had been held, and papers had been given by Messrs. Hogan, Bothwell, Nestor, Gosden, Messenger, Bice, A. Smoker, sen., Hewitson, and Roberts. A visit had been paid by the Branch to the garden of Mr. N. Rogers, at Stirling, and that gentleman had given a practical demonstration of pruning for the benefit of members.

MACADAMISED ROAD-MAKING.—This subject was dealt with in the following paper by Mr. Gosden:—"Stone must first be considered for its durability as metal when put down, and, secondly, its nature in regard to cost of breaking. The best stone will always prove the cheapest. Where it is possible roads should be well shouldered off. On account of main roads being narrow, the tendency is to force the metal outwards, especially if too much crown is given, a fault too frequently met with in the North. Where the average rainfall is small the water runs off too soon for the road to get the full benefit of the rain. Too much crown is also largely responsible for concentrating all traffic into the one wheel track or narrow groove. In making new roads, put some stiffening for foundation in the soft places, or in a very short time the metal or stone is driven down 8in. or 10in. A good road cannot be made by tipping the loads on to the formation, then knocking off the top and levelling. The stone should be tipped on an iron plate, and all turned back with the shovel in order to get a uniform thickness, thus avoiding an uneven and bumpy road when finished. Limestone in the North has proved a failure where heavy traffic is constantly carried, principally because of insufficient rainfall to preserve the moisture that is so much needed to hold roads of this kind together." In the discussion that followed members were convinced that in the North it was difficult to make good roads because of the lack of suitable stone. The strong winds swept the binding off and left the surface rough. Some members were of opinion that good quality limestone put down in sufficient quantities would make the best road.

Hawker, June 12.

(Average annual rainfall, 11½in.)

PRESENT.—Messrs. Pumpa (chair), Pyman, Ireland, Cannoll, Rhymer, and Smith (Hon. Sec.).

NOXIOUS WEEDS.—Mr. Pumpa drew attention to the fact that the star thistle was becoming a nuisance in the district. Mr. Ireland spoke of the folly of allowing this weed to go to seed. It was a mistake to cut the thistles after they had gone to seed unless they were burnt, as the wind carried the seeds longer distances than if left standing.

TELETYPE HON. SECRETARY.—On the occasion of the annual election of officers at this meeting, it was stated that Mr. J. Smith had acted in the capacity of Hon. Secretary since the inception of the Branch, 18 years ago, without a break.

Hookina, June 10.

PRESENT.—Messrs. Sheridan (chair), Stone, Henschke, P. and B. Murphy, Woods, Kelly, Madigan (Hon. Sec.), and five visitors.

FARM GARDENS.—The following paper was read by Mr. J. Henschke:—"Nothing improves the appearance of a farm more than a small garden. Besides growing your own vegetables you have fresh fruit during the summer months. Very often fruit bought from a store is withered before it arrives. For a garden in this part select a piece of ground that is flooded from time to time, as the rain which falls on the area itself is not sufficient to keep it going. The ground needs to be well ploughed, and also fenced with wire netting to keep the rabbits out. It is not advisable to plant trees too close to one another. I would advise 18ft apart. It does not require a deep hole to plant a tree, as long as it is big enough for the roots to be well spread. June is the best month in which to plant trees, as they then get a good start before the heat sets in. Fruit trees that do well in this district are apricot, peach, nectarine, almond, and fig. Vines do exceedingly well. Owing to the warm climate the grapes contain more sugar than those grown in the south. When cuttings are put in it is advisable to plant two in every hole, as one may not take root. Should both take root, one can be pulled out. Raisins and currants

can also be successfully grown. Young trees and vines need well looking after. For the first year they require plenty of water. The best way to water young trees or vines is to sink a trench round them 6in. deep 1ft. away, and fill it with cocky chaff, as this helps to retain the moisture, and prevents the soil from cracking. If 4galls. of water are put in this trench once a week it is sufficient. After the trees have made a proper start deep cultivation does not benefit them, and the ground hardens more after a flood. A light scarifier run over keeps the weeds down and helps to retain the moisture."

Morchard, June 13.

(Average annual rainfall, 11½in.)

PRESENT.—Messrs. J. Scriven (chair), Kitto, Kirkland, J. Scriven, jun., McCallum, Toop, Kupke, Loftes, and McDougall (Hon. Sec.), and visitors from Willowie, Wepowie, and Cboomooroo Branches.

SOCIAL.—Members had arranged for a social gathering for the annual meeting, and invitations had been extended to members of neighboring Branches. Owing to the very wet weather experienced the attendance was not as large as expected, but a very enjoyable evening was spent in social amusements.

FALLOWING.—Mr. McCallum read a paper on this subject:—"Every farmer should decide before the fallowing season which paddocks he will fallow, and feed these down as bare as possible. If he has not got a flock of sheep to feed the land bare it is necessary to burn all straw or dry grass off during the autumn months, for land that has a bare surface always fallows a great deal better, especially in wet weather, than ground that has a lot of straw or dry grass on it, as this rubbish not only sticks about the ploughs, and makes them heavier to draw, but prevents the soil being turned properly by the mouldboard. If the plough goes through the rubbish it only remains amongst the soil to hinder the working of the fallow in the future. Another point to bear in mind is that the farm should be worked as evenly as possible, for where the land varies it should be arranged so as to have a portion of the different classes of land for fallowing each year, so that if there comes a very wet spell of weather during the fallowing season the farmer can work on the land that is suitable for working in wet weather. The same thing applies to the land that works best in dry weather, thus enabling the team to be going regularly, and the land worked under the best conditions. Sometimes in the same paddock there is rising land that fallows well in wet weather and flats that you cannot work at the same time. It will be necessary to work short pieces on the rising land and leave the flats till they dry a little, for it is a great mistake to rush the team through boggy flats. Not only is there likelihood of injuring the horses, but the land is better left alone than turned up in great wet clods to bake hard in the sun. If it can be so arranged to fallow the paddock adjoining those under crop it will be found a great saving on the fences on account of there being no big stock grazing on the fallow to go reaching over the fence into the wheat crop. There are two important things to bear in mind when working the land at fallowing time: the first, to work the land so as to enable all the seeds of weeds and wild oats to grow: the second, to work the land in the best method to conserve the moisture. I think it would pay every farmer who has dirty land to cultivate it some time before the plough is started to work. If this is done to a depth of, say, 2in. it would break the hard surface, and a great portion of the seeds of weeds of various kinds that lie on top of the land would be stirred up with the soil, giving them a chance to grow before the plough is started, which will kill those that have started and turn the remainder under in fine soil, which they require burying in before they will grow. The best result I have had in cleaning land is to cultivate before the plough and then cross-harrow when ploughed, if possible, before any heavy rain has fallen to set the land, for if it is harrowed when it is loose just as the plough leaves the ground then the loose soil is shaken down with the oat seeds into the bottom of the furrow and the clods remain on top. If this is done I find that the greatest portion of the oats are placed in a favorable condition for them to grow. Then care must be taken to prevent any of the plants going to seed, and a lot depends upon how the fallow is worked as to how the moisture is conserved in the soil during the summer. I favor shallow reploughing on fallow that has a thick growth of plants that have to be destroyed. One good ploughing will often kill more weeds than two or three cultivatings. After the fallow has been reploughed it is necessary to harrow it any time after light rains, thus bringing the land to a fine surface, which will prevent the moisture from evaporating during the summer months.

SHALLOW PLOUGHING v. SUBPACKER.—Mr. H. Toop read a paper to the following effect:—"For some time past the Campbell system of dry farming has been very popular,

but I consider it will never become the general way in this district. Land ploughed up, say, 6in. or 8in. deep and subpacked is, in my opinion, no better than it would be if ploughed 2in. or 3in. and not subpacked, and needs very much more strength to do it. Then there are very many advantages with shallow ploughing against deep. Firstly, most of the land in this district has a clay subsoil about 4in. to 8in. below the surface. Everybody will acknowledge that it is a great mistake to turn this up, as it spoils the land for almost any crop. I have seen a good paddock ploughed up deep, turning up the clay, and it was years before it would grow even any grass. Secondly, it is absolutely necessary to have a solid seed bed for wheat-growing, with about 1in. or 2in. of fine, loose soil on top to cover the seed. This top soil should always be kept smooth and soft by cultivating (or harrowing) after rain; but I do not favor working fallow deeply, as this interferes with the solid seed bed, which should be left untouched even when seeding. The subsoil does not want to be loose and full of holes, as wheat roots do not need too much air. If land is ploughed deep it is necessary to subpack it. I have noticed various reports in the *Journal* from the experimental farms, where two plots are ploughed alike and one is subpacked and the other is not, and of course the one that was subpacked turns out a lot the most wheat. This is, I think, due to the fact that there is not enough solidity for the roots where it has not subpacked; but I have never seen an account of where there has been a third plot ploughed shallow and treated the same as the other two, with the exception of subpacking. [The figures published on page 643 of March, 1910, *Journal* show the results from 6in. ploughing and 4in. ploughing respectively during two years, and results are much in favor of 6in. subpacked against only 4in. ploughed, which was well worked afterwards, but not subpacked.—Ed.] A man with seven horses in a five-furrow plough, ploughing 2in. or 3in. deep, can do as much in a day as a man with eight or ten horses going 6in. to 8in., and he does not need to subpack. This means a great deal when horses are so expensive. I consider fallow the most suitable for this district, and if a man cannot get his fallowing finished before the beginning of September to allow him to work it over again he cannot expect as good a result as the man who cultivates or harrows his fallow after every rain. It is important that the land be worked in the best manner to kill rubbish, such as oats, &c. If the seeds of these are turned down 6in. or 7in. nothing like all grow with the first lot that come up; but a great number remain for years in the ground. I have seen this proved by a very dirty paddock being fed off for two years following, keeping it bare so that nothing went to seed (or very little). Then the third year it was fallowed, and in the spring time it was a mass of oats just as thick as if they had been left alone, showing that oats turned down deep will not grow for two years at least; but as soon as they are brought near to the surface they germinate. On the other hand, if land is always worked shallow just about all the oats grow with the first rain and can be killed before sowing, that is if there has been enough rain to start them. Here, again, the shallow ploughing has the advantage. In working fallow to kill oats say, cultivating or skim-ploughing land that has been ploughed deep and subpacked, a lot of the oats are growing from much deeper down than you would want to work it up, and the result is that a lot are only cut off instead of being rooted up, and they do not die. I strongly believe in harrowing fallow down level as soon after it is ploughed as possible; this keeps the top loose and fine, and also enables it to be worked more easily. If land is harrowed in a moist condition it will not set as hard as if harrowed dry."

Quorn, June 10.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. Thompson (chair), Finley, Schulze, Noll, Cook, McColl, Britza, Bury, and Patton (Hon. Sec.).

NOXIOUS WEEDS.—Members were unanimously of opinion that the star thistle was becoming a nuisance in the district, and that immediate steps should be taken to eradicate it. It was decided that the corporation of Quorn should be approached in regard to the matter.

ANNUAL REPORT.—The Secretary's report showed that during the year 10 meetings had been held, with an average attendance of seven members. The following subjects had been dealt with, viz.:—"Selling Bags as Wheat," "Cultivation of Fallow," "Value of Thorough Ploughing," "Curing of Bacon," and miscellaneous subjects. The Far-Northern Conference had been held at Quorn on February 14th, and was very successful.

Wepowie, June 5.

(Annual average rainfall, 12in.)

PRESENT.—Messrs. Halliday (chair), Gale, Knauerhase, Roocke, Chrystall, E. J. and C. Pearce, J. and T. F. Orrook (Hon. Sec.), and two visitors.

CARE OF IMPLEMENTS AND MACHINERY.—This subject was dealt with in a short paper by Mr. Roocke. A great deal of worry would be saved the farmer, he said, if all implements and machinery were overhauled and put into thorough repair when the season's work was completed. This applied particularly to the complicated machinery now in use. When working his implement or machine a man was better able to judge just what part needed adjusting or renewing than he could possibly be after the machines were put away for the next season's work. Putting things in repair during the slack time also avoided any loss through inability to obtain parts of machines or implements speedily. The cheapest shed for this district would be made of galvanized iron. Finally, a good coat of paint should be put on all woodwork to preserve it.

ANNUAL REPORT.—The Secretary read his annual report, which showed that six meetings had been held, with an average attendance of eight members. The present number on the roll was 13. During the year the following subjects had been dealt with, viz.:—Agricultural Bureau Work, "Gardens for Farmers," "Horse-breeding," and miscellaneous matters.

Wilmington, June 7.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Hannagan (chair), Hill, Noll, S. and D. (George, Zimmermann, Slec., W. J. and G. Schuppan, Farrell, Robertson, and Jericho (Hon. Sec.).

LUCERNE.—Mr. S. Robertson read a paper on this subject to the following effect:—"In preparing the ground for lucerne too much care cannot be shown, and when it is remembered that once planted it is there for 12 or 15 years, every effort should be extended to have the ground in a condition to enable the lucerne to flourish to its fullest extent. The soil must first of all be ploughed to a depth of 7in. or 8in. and then worked until it is as fine and well prepared as a flower garden; in this state allow it to remain as fallow, cultivating after every rain. Where the ground is uneven a grader should be used in order to be able to irrigate to best advantage, and where irrigation is carried on by flooding the ground must be practically level; of course, with sprinklers this is not so necessary. Another point to be considered is the application of manure, and farmyard manure is without question the best; but where this is not obtainable, the best substitute would be bone super., as the effect will be felt for three or four years. Seeding should take place about the end of March or the beginning of April in order to have the plant strong enough to withstand frosts when they come along. Some advocate sowing with a nurse crop; but, in my opinion, it is more advantageous to plant the lucerne by itself. I have seen lucerne plots under very favorable conditions turn out total failures on account of the nurse crop killing so many of the plants that the whole has to be replanted. If the climatic conditions are such that frosts come early and are very severe it is then advisable to sow about the middle of August, but plenty of water must be on hand to help the plant through the hot dry summer. Twelve to sixteen pounds of seed per acre is sufficient, either broadcast or drilled. If the latter method is employed drill half the seed one way and then cross-drill with the other half. The nature of the soil has much to do with the amount of seed used, and for some very rich soils 10lbs. would be sufficient. When the plant has grown high enough to clip, say 6in., run a mower over the plot, leaving the cutting on the ground. The next cut will be found to be much thicker and the plant will be crisp and luscious. To make lucerne hay the plant should be cut when the crop is about one-tenth in bloom and raked into windrows the same day before the stems begin to dry, as at that state a lot of the leaf will be lost, and this is the most valuable portion of the plant. It can remain in windrows till next day, when it should be made into stooks where it is left for three days, and must be turned each day to enable the sun and wind to come in contact with all the plants; big stooks are a mistake. The lucerne is then ready to be carted to the stack in the form of hay. When feeding the lucerne green more care must be taken, as sheep and cattle are inclined to become bloated owing to the generation of gases. When cutting and feeding the lucerne the animals are not so liable to 'blow' because the lucerne is not so fresh and the stock do not eat so much as when pasturing. In my experience I find that the nature of the weather has much to do with this trouble. On a cold day there is practically no danger; yet on a warm day, with a nice breeze, sheep

and cattle will blow readily. For cases of bloating on lucerne I prefer to give the animal fresh milk and walk it around, and in this way I have never lost an animal, whereas out of one mob of sheep I lost no less than 26 by using the trocar.

Willowle, May 13.

PRESENT.—Messrs. Hawke (chair), Howard, Schmidt, D. and L. McCallum, Foulis, Stone, Greig, McGilchrist (Hon. Sec), and one visitor.

DRY FARMING.—Messrs. W. P. Foulis and B. Schmidt read papers on this subject. Mr. Foulis said—"It is generally agreed that the proper state for the soil to be in to conserve moisture is, briefly, a loose surface to quickly absorb moisture as it falls and prevent evaporation. Next there should be a layer (2in. or more in thickness, the more the better) that is evenly compact and firm, and under this a bottom that will not allow loss by percolation; it must on no account be porous, but hard and firm. With the present drawing power farmers in this district could only work a very small area up to this perfect state. I consider it more profitable to work a large area moderately well than to bring a small one to perfection. It is, however, the land that is worked well that will give the best returns per acre over a number of years; so the better we work our land the greater will the returns be. No hard and fast rule can be set down as to how the soil should be worked. Each farmer must study carefully for himself. Farming is fast becoming a science, and it is the land that is scientifically worked—not necessarily that which receives the greatest amount of work—that will give the best results. Under the dry farming theory the land to be fallowed must receive a light working with a disc cultivator during the autumn. This serves to loosen the surface, so that it may absorb the moisture quickly and to cover the seeds so that they will come away with the first rains, and can then be killed when fallowing. A surface worked in this way when turned under will firm more readily and can be brought into a condition to retain moisture with less labor. As feed on the land to be fallowed is valuable it is unadvisable to work all the land in the autumn. Lack of time is also a drawback, and makes disking impracticable. I would advise running the stock early on the stubble paddocks to be fallowed. Burn in February; and if there is not time to disc, run the harrows over it. Fallowing should be commenced about the 1st of June. The depth to fallow is a debatable point. If you have the strength and can work the packer after the plough about 5½in., if not about 3½in. to 4in., perhaps it would be possible to do 50 acres of deep fallowing each year. During the winter the fallow should be harrowed. I prefer doing this first, harrowing when the top soil is fairly dry, with long-tined harrows, so that they may penetrate deeply and work the storage layer, so that it may firm up nicely. Every successive harrowing will naturally become more shallow as the soil firms. The oftener you harrow the better, being careful not to harrow when the surface is wet and sticky. In September or October the fallow should be cultivated to kill rubbish and loosen the surface. I favor working about 2in. so that there will be a liberal mulch to prevent evaporation during our hot, dry summers. Land worked in this way during a moderately wet winter will be found to retain considerable moisture at seed time, even after a dry summer. By careful working of the land when seeding much of the autumn rains may be retained for future use. It is when we get a dry spring that the well-worked fallow will give the better results than that indifferently worked. I consider the harrow the most serviceable implement for working over fallow. With it a large area can be gone over in a short time. They must be kept in good order. A harrow that will only tickle the top is useless, as it only hardens the surface and leaves it porous underneath. The same thing applies to harrowing when the surface is wet. A light spring-tooth or sulky cultivator is useful for working over fallow: with it a large area can be done quickly and well, looking at it with the idea of conserving moisture, but where there are oats to be killed it is of very little use. I consider the disc cultivator absolutely the best: the soil is well-pulverised, the weeds are all shaken out, and it leaves a fine even surface. It is unadvisable to fallow when the soil is very wet, as the soil cracks more freely and is harder to bring into condition. If wet fallowing is done it should be harrowed as soon as it is dry; if allowed to set it is troublesome. It is undoubtedly an advantage to use the packer if the necessary horsepower is available." Mr. Schmidt advocated harrowing the growing crop occasionally until the plant covered the ground. This kept the surface mellow and destroyed a lot of weeds. Mr. Howard said the stubble should not be burnt, but stock should be run on the land for one or perhaps two years after cropping. Mr. D. McCallum thought that if they did not burn the stubble the wild oats would take possession. Mr. L. McCallum advocated thick seeding with an early variety of wheat on dirty land.

Willowie, June 6.

PRESENT.—Messrs. Hawke (chair), Schmidt, McCallum, Stone, Howard, Bristow, Foulis, Greig, Bull, and McGilchrist (Hon. Sec.).

COLT-BREAKING.—The two following papers were read on this subject:—By Mr. S. Greig—"The coltbreaker is born a gifted man to handling horses; otherwise he may handle and break in colts for 20 years and still not become expert. Colts should be between three and four years old before they are broken in, although some are as fit for work at two and a half years as other at three and a half years. The handling necessary for colts varies according to the disposition of the animal. In all cases the colt should be well mouthed before putting into any work. The work should be light but constant. The crush pen is the best place in which to catch a colt, and he should be caught as quietly as possible. Speak to him whilst handling him and he will become tractable. An open bridle is the best to use for breaking in, especially for mouthing. A surcingle with crupper attached should be used. Always carry a stockwhip when mouthing; swing it and crack it but hit the colt as little as possible. Much time should be spent the first day in teaching the colt to submit to being caught. Most animals after being handled for a few hours can be let go and bridled again in the open yard. Repeat this during the first day or two and you will not be put to trouble to catch him afterwards. In approaching a colt always go to his shoulder and watch his eye closely. He should be handled on at least two different days before putting to any work, and not just caught and put in straight away. Such animals are never properly mouthed. Drive a colt between two broken-in horses with separate reins on it and make him pull a light sledge. A draught colt could be driven in this way and would soon go off all right in the team. For breaking harness horses drive them in the shafts of a spring dray, with a quiet horse on the outrigger and a separate pair of reins on each animal. After being driven awhile, the outrigger horse can be taken off and the colt driven home alone. To break a colt in to lead, get 20ft. of light rope, make in it a slip knot loop large enough to lie across in front of his hips and hang down behind nearly to his hocks. Put this on him, and when you wish him to move forward pull this rope and the leading rope and he will step forward immediately it is tightened. By doing this and using the back rope as little as possible the colt will soon lead without it. When teaching a colt to tie up he should be tethered the first time or two by a rope attached to the body. To do this tie about 4ft. of rope around his neck fairly tightly and as close up to his ears as possible; then tie another piece of strong rope about 20ft. long around his girth as tight as possible, placing the knot at the bottom. Take the other end of the rope, run it through between his front legs and through the loop that is around his neck and tie to a post. A colt tied up in this way will cause little trouble afterwards by hanging back. In breaking colts to the saddle keep them from bucking if possible and make them stand still while you are mounting. Get on very slowly. Equal care should be taken to make him stand while you dismount. Good judgment and patience are necessary for handling colts." By Mr. L. McCallum—"All farmers should understand the way to handle a colt. Many horses are jibs or mouthed on one side only through lack of care in breaking. A strong yard and crush pen is best for catching any young horse. When in the crush pen rub him down until he loses fear of you; then put a bridle on with the bit in his mouth, and let him alone for a day or two until he becomes used to the bit. Then put a rope on each side and endeavor to drive him about. In no case should he be run round with one rein, or you will find he becomes mouthed on one side and not on the other. The driver of a horse broken in like this is always liable to accident. If a horse gets a fright it will run away from the rein on which it was not mouthed. Sometimes colts become sulky when caught and will lie down. The best plan for dealing with these is to get a pair of quiet horses and try to coax the colt along. If it still remains stubborn try the whip. If this not effective let it go until next day. Generally it soon loses its sulkiness if you give it a touch or two with the whip, but do not use the whip any more than is really necessary or it will take a great deal longer to get it thoroughly quiet, because it will become frightened. I favor putting a colt on a log to drag about before putting in a team, because it can then be seen whether it has any vice or not. If put into the team direct, should it kick or fall down, some serious damage might be done to the rest of the team. The colt's shoulders should not be allowed to get sore. If there is any sign of swelling or scald, ease the collar. If you allow him to get sore shoulders it spoils his sale value as well as getting him into the habit of jumping about and jibbing. A colt that has the inclination to jib should not be whipped, but left alone, and in time he will start all right. If he kicks badly place him on the side that he kicks, tie his head to the hames of the inside horse, which should be very quiet, then place a bearing rein on him, and in this way he will not humbug the team. If he should get his leg over the chain put him right, because few colts stand when in this position. Everyone

must use his own discretion in handling colts, because their tempers vary. Some can be bounced and others have to be treated quietly. All coltbreakers should study the colt they are handling, and see to what treatment he answers best. This is the best method of quietening them." An enthusiastic discussion followed. Mr. Greig considered that colts should be taught to respond to the word of the driver rather than to the touch of the whip. Mr. Bristow said that draught colts should be broken to light work when they were about two years old. Mr. Schmidt said hard work when a colt was young would stunt the growth of the animal. Mr. McCallum believed in handling a colt from the time it was a foal.

Wirrabara, May 30.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. E. J. Stevens (chair), W. and W. H. Stevens, Hollett, Borgas, Woodlands, Pitman, Thiselton, Hoskins, Kendrick, P. and H. Lawson (Hon. Sec.).

WHEAT-GROWING.—Mr. S. Thistleton read a paper on this subject to the following effect:—He would fallow as much of his land as possible, starting as soon as seeding is finished. Early in the season plough 4in. to 5in. deep, but later do not go so deep, as the land will not firm down sufficiently to give a good seed bed. After ploughing, harrow across to fill in wheel tracks and furrows; harrowing at this time will also encourage the seeds of weeds to germinate. Destroy all weeds with the cultivator before the ground gets dry. It is also important that the weeds, especially stinkwort, should be destroyed before they make much growth. The fallow should be worked with cultivator or harrows after any rain following harvest. He preferred the cultivator for this, as in his opinion the land was better worked and more moisture retained. It was not necessary to pickle seed wheat if sowing in dry land, but after rain he would only sow pickled seed. Do not sow too soon after pickling, or use too strong a pickle. He always preferred to wait for rain if possible before sowing, as he thought the crop did better if it germinates quickly. He would put 1bush. to 1½bush. of seed per acre, and liked to secure a change of seed every second or third year. He had found Marshall's No. 3 one of the best he had ever grown, as year after year it yielded well. Federation was also a splendid cropper, but very brittle to handle. It should not be sown in dry ground as it was very liable to "black rust" (flag smut). Though not very rust-resisting it appeared to escape injury owing to its earliness. Silver King was another good all-round wheat for this district, while as a hay wheat Baroota Wonder was about the best he had grown. He thought it a good practice to burn the stubble, as the old straw in the fallow was of little good, and was a nuisance in the way of the cultivator and drill. The fire also appeared to do the land good. Paper was well discussed. Mr. Woodlands recommended a solution of 1lb. bluestone to 10galls. of water (a 1 per cent. solution) for pickling. Mr. Lawson said he found that on land ploughed late and worked and sown dry there was always a lot of black rust.

SHEEP AND STINKWORT.—Some discussion took place on the question as to whether stinkwort was responsible for the death of sheep. Mr. Lawson thought it was, and that it caused inflammation of the bowels. Sheep in poor condition did not appear to suffer like fat stock. Mr. Kendrick thought death was due to bloodworms and not to stinkwort.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Appila-Yarrowie, June 14.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. Bottrall, Daly, Francis, Catford, Jericho, Klemm, Keller, and Heaslip (Hon. Sec.).

DIPPING SHEEP.—In reply to a question, Mr. Daly said dipping sheep helped to prevent fly-blow. Mr. Francis said dipping was not only a protection against flies and tick, but improved the brightness and general appearance of the wool.

HAND & MACHINE SHEARING.—Some discussion took place regarding machine and hand shearing of sheep. Some members still preferred the blades; but the general opinion was that in the near future central shearing depots would be formed and farmers' lots would be brought there and shorn by machinery at a fixed price.

SUPERPHOSPHATES.—Some discussion took place regarding the respective merits of several brands of super. On a vote being taken, all those present, with only one exception, considered English super. superior to the locally-made article. From 70lbs. to 80lbs. per cwt was recommended as a profitable dressing.

Beetaloo Valley, June 12.

PRESENT.—Messrs. J. Burton (chair), Bartram, Curtin, Hamilton, Petrie, Cox, Jacobie, Ryan, Woolford, F. Bartrum, sen., and two visitors.

ANNUAL MEETING.—The Secretary read the annual report, which showed that 10 meetings had been held, and the attendance had averaged eight. The following subjects had been dealt with:—"Clearing New Land," "Citrus Fruits," "Handling Young Horses," "Farm Management," "Summer Vegetables," "Mixed Farming," "Poultry-Raising," "Care of Farm Implements." Interest in the Branch had been well maintained during the year.

KANGAROO ISLAND.—Mr. Hamilton gave an interesting account of his recent visit to Kangaroo Island.

Narridy, June 10.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. Harn (chair), Lang, E. and P. Smart, Nicholson, Liddle, Satchell, and Darley (Hon. Sec.).

NOXIOUS WEEDS.—Mr. Satchell spoke of the folly of allowing weeds to spread and get a firm hold. If they were dealt with when they first appeared it was comparatively easy to eradicate them, but when they got a hold it was almost impossible to kill them, and sometimes would cost more than the land was worth.

Port Broughton, June 9.

(Average annual rainfall, 14 in.)

PRESENT.—Messrs. Pattingale, sen. (chair), Storr, Whittaker, Harford, Donnelly, Barclay, Hoar, and Pattingale (Hon. Sec.).

NOXIOUS WEEDS.—Considerable discussion took place regarding the spread of noxious weeds, and, viewing the situation with some alarm, the Branch decided to communicate with the district council, asking that the provisions of the Noxious Weeds Act should be strictly enforced, as well as to call the attention of the council to the necessity for the destruction of rabbits.

Port Germein, May 20.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Carmichael (chair), Crittenden, Head, Hillam, Blessing, and Stock (Hon. Sec.).

DRY FARMING.—Mr. Crittenden read extracts from various articles on this subject and commented thereon. A good discussion followed, members being generally of opinion that the ideas advocated were not applicable to this district.

Port Pirie, May 16.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Munday (chair), Johns, Welch, Jose, Birks, Eagle, Hector, Hawkins, and Wright (Hon. Sec.).

FARM PESTS.—Mr. W. Munday read a paper on this subject to the following effect:—"Amongst the most destructive pests those engaged in agricultural, horticultural, and

pastoral pursuits have to contend against the rabbit easily takes first place, while the fox, the hawk, the crow, starling, and sparrows run a good second. The annual losses sustained throughout the Commonwealth owing to the depredations and ravages of these pests, not to mention the loss of time and money spent in wire netting and other ways of trying to minimise their ravages, is something appalling, and when we calmly consider the serious nature of this ever-growing evil we are lost in amazement at the criminal lack of foresight shown by those responsible for their introduction into Australia. As we should strive to minimise the evil by doing our utmost to keep these pests in check, how best to cope with the evil is a problem difficult of solution. There are various ways of dealing with the rabbit, such as trapping, the use of dog, gun, and poison, breaking up and digging out of burrows, &c., but each and all are more or less costly and not altogether effective in the destruction of the rodent, as it invariably happens that a number of the rodents escape, and, owing to their fecundity, after a short period they become as numerous as ever. Personally, I have met with best results from the use of phosphorised pollard baits; but, unfortunately, the use of this poison entails a certain amount of danger from fire, also from cattle and sheep picking up portions of the baits and of eating dead rabbits. Then again, unless the baits are thoroughly covered the loss of insect-eating birds is more or less great, owing to their fondness for this form of food. Next to the losses through the agency of the rabbit must be placed the loss of lambs during the early period of lambing, owing to the ravages of the foxes; the hawk and the crow also have a partiality for similar diet; and the loss annually from these three pests will, I venture to say, run into enormous proportions hard to calculate. My loss this year already is 25 per cent. of lambs, which will, I have no doubt, be largely increased before the end of the lambing season. This in spite of repeated distribution of poisoned baits in close proximity to the flock. Facts like these should be sufficient to stimulate everyone engaged in similar pursuits to put forth every effort towards the destruction of pests so costly. In a season like the present, when the land is literally teeming with mice, the difficulty is to know what steps to take to cope with this particular plague. To prevent damage being done to hay in stack I have found iron placed around same immediately after erection of stack is very effective, and the same methods should be adopted in storing seed and grain of every description. This, with the judicious use of poisoned grain around the same, will minimise to a great extent loss from this source. In dealing with the sparrow a fair amount of success will be met with by taking particular note of their feeding grounds and distributing sound grain thereon for a few days in succession, when this diet may be exchanged for one consisting of poisoned grain spread early in the morning before they leave their usual haunts. The sparrow, however, is a very intelligent fellow, and is not likely to be taken in more than once or twice in the same spot; hence it will be wise to watch him carefully, with a view to discover fresh feeding grounds, following the same tactics as before. The starling is another pest that has to be reckoned with in the near future, for while his destructive propensities may not be quite so great upon the farm, yet amongst the gardens and orchards his talents in this direction is already severely felt. I believe much good would be brought about by members of the various Branches of our Agricultural Bureau interchanging ideas and experiences, giving actual results from experiments undertaken in their efforts to cope with the various pests. This would perhaps help to prevent waste of time and energy in unprofitable methods. More support should be accorded those in authority in enforcing the provisions of the Vermin Act against those who, by their apathy, indifference, and neglect, allow their lands to become breeding grounds for vermin and a menace to the whole community. No mercy should be shown to these people, as much of the loss sustained is brought about by their neglect." An animated discussion followed. Mr. Birks thought the fox was blamed in many cases for killing lambs which had really been destroyed by crows. It was only on rare occasions that foxes would tackle sheep or lambs. Mr. Welch agreed that the crow was responsible for a great deal of the damage done to young lambs. Rabbits were undoubtedly the worst pest which the landholders of this district had to contend with. He had used bisulphide of carbon on pieces of rag very effectively for exterminating them in burrows. Strychnine on pie-melon slices had not proved a success. Superphosphate bags stuffed into the burrows was a good plan. Mr. Johns mentioned that another pest was the stray dog nuisance. The worrying of sheep by dogs was a serious matter, as the sheep took a long time to recover from shock. He had lost lambs, but was not prepared to say that they were destroyed by foxes. The foxes were practically cleaning his scrub of rabbits at the present time, and while they were doing good in that respect he was inclined to leave them alone. Mr. Eagle thought that an effective method of destroying mice would be to distribute phosphorised wheat about the tracks in the paddocks. Mr. Hector stated that mice could be poisoned in the dry weather with strychnine or cyanide of potassium.

in water. Another good poison was as follows:—Take one tablespoonful flour and as much strychnine as could be placed on a threepenny piece; roll strychnine into powder and mix well with the flour, adding sufficient white sugar crushed finely to sweeten. The poison should be placed in small tins. The Chairman, in replying to the criticisms, said the fox was not a friend to any farmer. He had lost about £80 worth of poultry last season as the result of the theiving propensities of reynard. He favored using the poison cart in the autumn as the best means of destroying rabbits. Rain and cold weather were the most effective agencies for ridding the land of the mice pest.

Port Pirie, June 3.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. Munday (chair), Johns, Welch, McEwin, Hawkins, Lawrie, and Wright (Hon. Sec.).

CARE AND MANAGEMENT OF FARM HORSES.—Mr. F. Johns contributed the following paper:—"Good horses cost money. They should be comfortably stabled and well fed. It is not desirable that the stable should be closed in. I believe in plenty of open space. There should be protection against bleak winds, and a roof that will keep out the rain and provide shade in the summer. I prefer a straw roof; it is more comfortable in winter and cooler in summer than iron. Have a separate stall for each horse, and each horse should have its own box for short feed. A larger one may be shared between two horses for long hay. They should be fed as regularly as possible, and should not be given more than they will clean up readily. They should be well groomed at least once a day, and if time will permit a rub down should be given at dinner time. Care should be taken to brush the dust off the shoulders. Through neglecting shoulders and collars, farm horses suffer to an alarming extent with sore shoulders. I have seen collars put on when lumps of mud were sticking to both horse and collar. If a driver has some pride in his team there will not be so many wounds. It is common practice nowadays to work up to eight or nine horses of varying size and pace in one team. They are put together abreast, and driven with a guiding rein attached to the bit ring of each outside horse. I have seen the driver of a team of nine horses hang on to the guiding rein with all his strength and expect that team to answer promptly. The controlling horse should have gentle pressure brought to bear on it, and at the same time it should be spoken to plainly and distinctly. Avoid working fast and slow horses together. I know it is difficult to avoid doing this with big teams. If the team is required to do a lot of travelling in a given time, it should have a light load. If the weather is warm and sultry give the horses occasional rests. Let the horses drink when they come from work, and also when they go to work, and they will not drink so much at a time. Some farmers have the water trough so that the horses can get at it from the stable. I think it is a bad system for the reason that the horses go to it very frequently and slobber in it. The water is always foul. There are two very bad faults that some horses are addicted to. One is tossing the head, thus jerking the mouths of the other horses. This can sometimes be overcome by taking the bit out of the horse's mouth, especially in young animals. The other is what is known as shunting, a form of jerking in their work. It is not done when the animal is drawing farm implements, but in wagon and dray work. I do not know any cure for it. No good is done by thrashing. I believe in carrying a whip and sometimes using it, but not to be continually flicking the horses with it. It sometimes does a horse good to get a good sound thrashing; but while you may do good in some instances by administering a thrashing, some horses would be ruined by it. If horses have faults, their faults are frequently created by bad management. Jibbing is generally caused in this way. A horse is never born a jib. Much good can be done by studying the disposition of the horses under one's care." Mr. Hawkins thoroughly agreed with the views expressed in the paper. He had proved that it was a bad plan to have the water trough in the stable where the horses had access to it during feeding time. When so placed it was difficult to keep the water from becoming dirty. He had removed the trough from the stables, and his horses had since thrived better. It was advisable to stall each horse separately, even though a little extra labor in feeding was incurred. Mr. McEwin agreed and indorsed the writer's opinion regarding grooming. The Chairman said that while a well-ventilated stable was necessary, it should not be draughty. Although a straw roof was cooler, it was not durable. It was an expensive matter to have each horse in a separate stall. They were not apt to interfere with one another when feeding. Single stalls were not so convenient for the feeding of hay. Young horses should be fed at one end of the shed and old ones at the other. Care should be taken that all

collars fitted well. He believed in letting horses drink at any time they desired. If they were brought up to this habit there would be no harmful effects. The water trough should be placed away from the stable. He would carry a whip when driving, but it should be used with discretion. Habits such as jerking and throwing the head back were generally contracted when the horse was young, and were due to sore mouths. A good plan of breaking the habit was to put the horse on the outside of the team, take the bit out of its mouth and fix a hames strap under the jaw. At this time of the year horses should be stable fed on hay or chaff. Mr. Johns said wild melons, especially when dry, were practically poison to horses. Replying to a question the Chairman said he fed the very best hay he had to his horses. They would not thrive on inferior hay.

POISONING RABBITS.—Mr. Hawkins had used the carbon-bisulphide method of poisoning with success. The work was comparatively easy, the cost reasonable, and the results eminently satisfactory. He filled in the burrows the day before distributing the poison. Then it was only necessary to charge those holes which had been reopened. After laying the poison he placed a superphosphate bag in the mouth of the burrow, and then covered it with earth. Tins could then easily be collected for further use.

Whyte-Yarcowie, June 10.

(Average annual rainfall, 1.4 in.)

PRESENT.—MEMBERS. Look (chair), Pascoc, McCann, Mudge, Pearce, McLeod, O'Halloran, Wittwer, Mitchell, Ward, E. M. and G. F. Jenkins (Hon. Sec.).

FORESTRY.—Mr. Pearce read a paper on "Afforestation" to the following effect:—
 "In attempting to write a paper on this subject I recognise I am setting myself a difficult task. The scope of the subject is so wide, and the difficulties of carrying out a practical scheme so great, that one may well pause before attempting to lay down any plan or scheme for securing the above object. But, on the other hand, we have the recognition on all sides of the need of some systematic effort to grapple with the question. Most of the great nations are more or less alive to the wisdom of replenishing the denuded forest areas. On the Continent, in Russia, attention has long been paid to the preservation of indigenous timber. In Germany there is a rule that a tree shall be planted for every one cut down, and we are told so well is this rule observed that no serious diminution of the supplies has taken place. The United States is another country that is awake to the need of afforestation. It was in the State of Nebraska, in the year 1872, that that Arbor Day was first instituted with the object of awakening in the children, and their elders also, a sense of the need and value of tree-planting, an institution which we have done well to copy. Great Britain, among the awakened nations, seems to have been slowest to realise her responsibility to posterity in this respect; but she is now taking steps to atone for her laxity. In our own State enthusiasts have for years been battling for a fuller recognition, both by the State and the individual landowner, of our obligations in this matter. I use the word "obligations" advisedly. We cannot ignore our duties which we owe to posterity; it may be to our personal advantage temporarily to clear every acre that it is possible to clear; and far-seeing men have predicted a treeless world as a consequence. But who can contemplate such a world without feelings of horror, and yet how rapidly we, in this State, are advancing in that direction. How this tendency can be checked and afforestation encouraged is, I take it, the prime object of this paper. Primarily in my opinion this is a matter for the State through its elected representatives to deal with, *i.e.* because it is a subject in which every member of the community is interested. Outside of certain narrow limits the individual landowner who plants trees is taxing himself for the benefit of the whole community, because directly outside of those limits it is not a payable proposition. What, then, are the limits, and what the practical duty of the State? First, the individual: to provide shelter for stock, particularly in bleak, unsheltered country. Very much more might be done in this direction, and done as a paying proposition. I believe it would pay to plant with trees from three to five acres in every 100 on the average farm. The shelter would more than make up for feed lost, and in a few years the thinning out of plots and falling branches would at least materially lessen the amount of the wood bill, to say nothing of the beautifying effect, and a possible effect on the climate if it were generally gone in for. Of course on many farms there are awkward corners or stony and uncultivable lands that will grow trees. Then every farmhouse should be surrounded with trees, which beautify and add to the comfort of the homestead. There may be some who will object and say that trees will not grow around their homes. Well, I admit in some cases the site for

homestead has been badly chosen, but I believe with care and attention, and, most important of all, adequate protection from stock and vermin, trees could be grown around the most unfavorably situated homestead in this district. Now, as to the State: I believe the present Commissioner of Crown Lands is fully seized of the importance of the question. But as far as my knowledge goes nothing adequate is being done to check the wholesale denudation of the new areas of mallee country being opened up. It is a very old proverb which says 'Prevention is better than cure,' and it does not require a very vivid imagination to see the immense areas of Pinnaroo and Eyre's Peninsula lands a huge wind-swept desert if laws are not enacted for the preservation of considerable areas of the indigenous scrub, or better, perhaps, replanting with a superior class of timber if found practicable. In my opinion it would be practicable to have a condition in the lease or agreement compelling the occupier to reserve 100 acres in every 1,000 of the holding, or, as an alternative, plant and maintain at least 50 acres per 1,000 with superior timber. Then I think the operations of the Forest Department could with advantage be increased. An area of North Booborowie might be reserved for forest purposes. It is a pity that some 4,000 or 5,000 acres of the Yongala Estate was not so reserved, as it would grow timber to perfection. Of course all this would mean expense, and expense in connection with such work means for the present, at all events, taxation; but it would be an expenditure in the present that in the future will return interest in geometric ratio—in a modified climate, a beautified landscape, and in actual hard cash as it came into use for economic purposes. In conclusion a tribute of appreciation is due to the authorities responsible for the institution of the free distribution of trees from the various nurseries under Government control, which has no doubt been the means of thousands of trees being planted which would not have been otherwise. If they could see their way clear to arrange to place the boxes of young trees on railways to order of those requiring them it would be another step towards encouraging the planting of greater numbers. Just a word as to time and methods of planting. I have been most successful in planting in the months from September to November in this cold district. If possible I find it best to thoroughly plough and cultivate the ground. Plough in June if possible; then all that is necessary is to fork the spot where tree is to be planted as deeply as possible. This applies, of course, to ordinarily favorable soils; in unfavorable situations more preparation is needed." Mr. Ward spoke of the great value of gum trees planted by him 30 years ago. For the past 10 years he had obtained all the corner and gate posts needed on his farm from his own plantation. Mr. Jenkins thought it would pay every farmer to put in a few trees every year. They required a little attention at first, but would well repay the grower for his trouble. Mr. Wittwer thought it should be made compulsory for all landowners to plant a certain number of trees each year. It was resolved that in the opinion of this Branch the Government should reserve a portion of North Booborowie for tree-planting.

Yongala Vale, June 3.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. Lloyd (chair), F. and H. Miller, Battersby, Dowd, J. and P. Chigwidden, Cooper, Scott, W. and T. Keatley, Laubsch, Fowler, and Schmidt (Hon. Sec.).

CONCRETE FLOORS.—Mr. T. H. Battersby read a paper on this subject to the following effect:—"To make a good and substantial concrete floor select rough but clean gravel from a creek and mix it up with lime that been well slaked in a heap, using a shovelful of lime to three shovelfuls of gravel. Let the mixture lie in a heap for three or four days, turning it over twice every day, and then it will be ready to spread over the required floor. Before the concrete is applied the floor should be levelled off with small stones or metal; then damped and rammed down firmly to make it set. The concrete should then be spread to a depth of at least 3 in., and in no larger sections than can be easily reached over with a float trowel. Smooth it down and sprinkle dry cement evenly over it; then work the cement about an inch deep into the concrete with the trowel, and smooth it down again to the correct level. The floor should be rammed evenly as soon as it is dry enough, care being taken not to let it dry too quickly. A floor should not dry under 14 days' time, and should be damped if it dries in less time."

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Blyth, June 13.

PRESENT.—Messrs. Coleman (chair), Schuster, J. C. and A. A. Schulze, Pratt, Buzacott, Pedler, Gell, Ninnies, Lehmann, H. W. and W. O. Eime (Hon. Sec.).

CARE OF MACHINERY.—This subject was dealt with in a paper by Mr. Buzacott. He advised, in the first place, the purchase of the best machinery procurable. Nuts and bolts should be kept well tightened, and it was a good policy to keep an assortment of bolts handy for use in emergency. Ploughshares should be kept sharp, and all axles thoroughly clean and well greased or oiled. For implements which were constructed of iron or steel he would not go to the expense of erecting sheds. Wooden swingletrees could be replaced with either gaspipe or spring steel ones to save putting these under cover. Drills should be kept clean, especially the discs, and should be put under cover every night and when not in use. If super. was allowed to remain in the box overnight, the discs should be worked by turning the square bar with a spanner before moving the horses; otherwise the phosphate, having set down firmly, might twist the bar and break cogs and castings. Super. of a wet or sticky nature should be avoided, as this caused heavy wear on the drill. The binder should also be kept in a shed when not at work. Pieces of wire should not be used to mend breakages; but parts broken or lost should be replaced immediately. Knives must be kept sharp, and a good even-running twine used. Strippers and winnowers needed to be well housed when not in use. It was necessary to see that the comb of the harvester is properly closed, the bearings firm and true, and the sieves and screens in order to reduce loss of grain to a minimum. The engine, which was fast taking the place of the horseworks, should be well housed, the best kerosine being used for fuel. Vehicles should be painted every three years, and tires should receive the best of attention. The most suitable time to have wheels tired was probably in January or February, when all moisture had been dried out. It did not pay the farmer to do too much of his own blacksmithing, as his time could be better spent, but he would recommend every farmer to have a small forge and anvil, drills, stocks, and dies to meet cases of emergency. In reply to a question, Mr. Buzacott considered it unadvisable to repaint ironwork when the first coat was worn off. Members agreed with most of the paper, but thought it unnecessary to place a drill under shelter each night if a good cover was thrown over it.

Clare, June 9.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. McKenzie (chair), Jarman, Pascoe, Berridge, Walker, Pink, Kelly, Dux, Lee, Keane, Menzie, Scales, J. H. and P. H. Knappstein (Hon. Sec.).

NOXIOUS WEEDS.—It was resolved to write to the local district councils urging upon those bodies the necessity for enforcing the laws relating to the destruction of star thistles, Bathurst bur, and other noxious weeds.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that 12 meetings had been held and two public lectures arranged. The average attendance has been 17, and nine papers have been read. The improvement in attendance and general interest in the Branch work has been very marked during the year.

Freeling, May 12.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Neldner (chair), Neindorf, Heinrich, Elix, Koch, Block (Hon. Sec.), and about 40 visitors.

DRY FARMING.—On the invitation of the Branch, Hon. T. Pascoe, M.L.C., gave an instructive address on the Campbell system of soil cultivation and its application to South Australian conditions. While they were getting good results from the system adopted in the Freeling district, he thought there was still room for improvement. They could not lay down any definite rules as when and how any particular work should be done; each farmer must exercise his own judgment, keeping in view the main principles of their operations. This particularly applied to the question of deep or shallow ploughing. He urged the necessity for members of Branches carrying out careful experiments in different directions, reporting the results for the benefit of their fellow-members.

Gawler River, June 9.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. J. H. Dawkins (chair), A. M. and C. A. Dawkins, Dunn, B. and J. Hillier, Roediger, Leak, Rice, A. J. Bray, F. Bray (Hon. Sec.), and three visitors.

NEW FACTORS IN SOIL FERTILITY.—Mr. E. Aitchison gave an interesting address on this subject to the following effect:—"The years that have elapsed since the use of artificial manures became general have proved so conclusively their value that undue credit has in many instances been given to them where crops have been successful, and undeserved blame where they have failed. Quite other reasons may have accounted for either the failure or success. The Professor of Botany at the Melbourne University, in a recent article on 'Limiting Factors in Agriculture,' actually placed the supply of the mineral elements in the fifth place among the essential factors for success. I need not recapitulate what is now so generally known and admitted as to the necessary ingredients in most artificial manures, viz., phosphate, potash, and nitrogen, nor tell you that among most South Australian farmers artificial manures are summed up in the one word 'super,' and the only problem, if it can be so called, is the most profitable quantity to apply. It is an admitted fact that the present wheat-growing districts of this State have the simplest and cheapest solution of manurial problems of any country in the world, when we learn that the dressing an up-to-date farmer in Europe would consider necessary to apply in order to secure the maximum crop would not be less than 3cwt. super., 1cwt. potash, and 1cwt. nitrogen, for, say, a yield of 40bush. of wheat. Compare this with our 80lb. to 100lb. of super only, and then frequently harvesting as large a crop. The less thoughtful person would almost be inclined to think our crops did not contain or require the same elements as in other countries; but of course this is not so, and although our soils on account of their large natural potash contents have that initial advantage, what of the nitrogen—in wetter climates the most necessary element for application? In ours it is scarcely considered, and the fact has to be admitted that, with the exception of a moderate quantity used in market gardening, its use elsewhere has only given negative results. Still the crop to be successful must have its nitrogen, and whence is it obtained? Our earliest demonstrators, following on European lines, tried dressings of all the three necessary manurial elements, finally proving and recommending the use of phosphate only; but also with the warning that, although its use alone was satisfactory, the future would certainly require the addition of nitrogen as well, as the crops must be depending on the supply stored in the soil, and which must sooner or later become depleted. But what do we find? That heavier and more successful crops are still being grown, and in place of any evidence of decrease in the nitrogen supply, indications are not wanting that more is available than crops actually require. The natural deductions are that the teachings of the past have been at fault, and other unthought-of agencies have to be reckoned with. Important discoveries frequently occur in the most simple manner. It was noticed by gardeners who used steam pipes to heat beds of soil before planting special seeds in order to destroy foreign seeds and insect pests that the plants afterwards appeared to obtain such increased vigor and growth that could not wholly be attributed to their freedom from weeds and pests. Also that where vineyard soil had been treated with an antiseptic like bisulphide of carbon to combat the spread of phylloxera, not only had the phylloxera been checked, but the following crops had increased so much in quantity and quality as to give rise to much speculation as to the cause. On scientific investigation being made it was found that these soils contained an enormous number of bacteria. Further investigation showed that immediately after treatment this was by no means the case, but it also showed that another group of organisms usually present in the soil had disappeared; neither were they present afterwards, when the number of bacteria had increased so enormously. These bacteria, of which many kinds have been identified, were the agencies in bringing about nitrification in the soil and converting the organic nitrogen into available form for plant food; and it was also found that some kinds had the power of fixing in the soil the free nitrogen from the unlimited supply in the air. This at once gave an idea of the immense possibilities when conditions for the bacterial development are favorable. These facts were pregnant with meaning, and have been the subject of the closest investigation in parts of the world during the last few years, and many definite conclusions have been arrived at. The most important as regards agriculture are that there are two groups of organisms in the soil—the one favorable, the other unfavorable to plant life, the latter preying on the former, the situation being aptly described recently in an article by A. D. Hall and entitled 'The Soil as a Battleground.'—We must begin with the fact that the fertility of the soil depends, other factors being equal, upon the activity of its bacteria reducing the residues of past vegetation or manure to simple compounds like ammonia or nitrates, upon which the plant can feed. When soils are partly sterilised by heating

or treating with an antiseptic then fertility is increased. This increase is due to a more rapid production within the soil of ammonia, caused by the multiplication of ammonia-making bacteria never experienced in the natural soil. These do not multiply in the natural soil because they are kept in check by certain large organisms (the protozoa) which live upon the bacteria, a position of natural equilibrium being maintained between the two groups—the destroyers and their prey. The partial sterilisation processes almost wholly destroys the protozoa, and the bacteria which may survive rapidly, multiply because relieved of the normal check to their numbers.' Now, although so far no process is available whereby these small tests can be applied in large fields, the fact that they have been definitely demonstrated will lead to the hope that the time is not far distant when persistency will overcome the drawback. As Professor Watt, of the Sydney University, puts it—'The best we can do is to make the conditions for the development of the bacteria as favorable as possible.' Chief of these conditions are good drainage, good aeration, and sufficiency of moisture, and, peculiar as it may seem at first glance, sufficiency of lime, phosphate, and potash in the soil. A. D. Hall expresses his hope as follows:—'These experiments show the practical gain that is in sight, but it always takes some time before an experiment can be translated from the purely scientific stage to that of practice—from the scale of pots to that of acres. Moreover, the partial sterilisation of the soil in the field is a pretty wholesome undertaking. Still, sooner or later our trials will reach a cheap and practical issue.' Reverting again to the conditions favorable to the increase of these bacteria, a study of the subject opens out avenues that each can make the most of. With the latest information on the subject it will well repay one's study of the subject of the best use and treatment of stable manure. Old theories on the benefit of its use referred to the humus added to the soil its percentage of nitrogen, and the improved physical soil conditions. These factors, however, sink into insignificance in comparison to the almost unlimited benefit derived from the addition to the soil of the enormous quantity of bacteria that stable manure contains. This is too large a subject to go too closely into, but investigation will well repay the trouble. For instance, it is found that manure from cattle fed on grass and then later fed on hay will show that the latter feed increases the bacteria in the manure a hundredfold. This paper, though somewhat disconnected, may indicate directions in which advantage may be taken of the results of scientific research on this most important phase of soil fertility and help to explode many old fallacies propounded on insufficient premises. The chief of these may be the theories advanced in support of objections to scrub and stubble burning. It requires a lot of theory to convince the man who has to handle a scrub section only partially burned, or one who has to struggle with his plough through a thick crop of stubble he is trying to convert into humus, that 'the game is worth the candle,' but when he finds that where he has had the scrub or stubble burn his crop is much better, not to mention the quantity of weeds destroyed, can you blame him if he doubts the truth of the assertion so frequently emphasized that the preservation of his humus must be made at all costs, and hails with pleasure the conclusion obtained in all these modern investigations that the burning operation is the most simple and effective method of increasing his soil fertility by aiding his unseen friends to multiply and increase without hindrance."

Nantawarra, June 13.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Greenshields (chair), Sleep, Herbert, Smith, Sinclair, Uppill, Dixon, R. and J. Nicholls (Hon. Sec.), and two visitors.

CHEAPENING WHEAT PRODUCTION.—Mr. R. Nicholls asked whether members could suggest any cheaper method of producing wheat than under the system adopted in this district. The practice of doing all the following with the plough was very expensive, and he thought that with much of their soil a good cultivator would give a good result and lessen the outlay. He thought they should experiment more in this direction. Mr. Herbert thought the fact that more wheat was produced under the present system on a smaller area than formerly showed they were making progress in the direction indicated by Mr. Nicholls.

WHEAT v. BRAN AND POLLARD FOR HORSES.—Members expressed the opinion that clean wheat, whole or ground, was a more economical feed for horses than bran and pollard at present prices, but oats were considered to be better still.

Northfield, June 6.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Williams (chair), Dall, Kelly, S. and W. Eastwood, Nelson, Rowe, Goldney, Reynolds, McAuley, Roeger, and Mitchell (Hon. Sec.).

SELECTION OF COWS.—Mr. Goldney submitted a short paper, in which he stated that cows should be selected with special regard as to whether they were required for milk or cream production. The milk from heavy milkers, as a rule, was lacking in quality, and was not profitable to the butter-maker. For milk alone, large-framed cows, rather coarse-looking, similar to the Holsteins, were to be preferred. These were hardy and even in milking, whereas a good cream cow was often the reverse, requiring more care. The cow kept for cream should have a soft, fine coat, should be broad between the hips, tapering gradually toward the head, with small, clean horns, wide nostrils, and a bright, full eye. There were good and bad cows in all breeds, and much depended upon the feeding and general care bestowed. In judging cows, the shape of the udder could be relied upon to an extent as an indication of the value of the animal. The bag should be square, projecting forward and reaching well up behind, with good teats, not too close together. There should also be plenty of width between the hind legs. In the discussion that followed Mr. Rowe spoke of the effect of certain foods upon the quantity of butterfat in milk. Mr. Williams had proved the value of crushed peas for cows. He liked the Shorthorn breeds. Messrs. Dall and McAuley instanced cases in which cows had been profitably milked for long periods without calving. The latter advocated bran and oilcake for the production of butterfat. All agreed that the best milkers were to be obtained only by judicious selection and breeding, giving full regard to the bull used.

Saddleworth, June 16.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. Townsend (chair), Frost, Graham, J. H. and T. E. Eckermann, Klem, Manning, Crawford, Snell, and Coleman (Hon. Sec.).

NOXIOUS WEEDS.—Some discussion on this subject took place. The eradication of these weeds, particularly of the three varieties of star thistle, often termed true star, common or saffron star, and yellow or English cockspur, had been a matter of serious consideration for years past. This Branch wished to strengthen and support the local council in its efforts to enforce the destruction of these thistles, but recognised the difficulty one council might have in trying to carry out the Act while another neighboring council practically neglected to take any action. It was pointed out that in parts of this district the common star or saffron thistle and the yellow star or English cockspur had taken possession of the land almost as much as the stinkwort, and its eradication was hardly within the means of the landholders. These thistles needed cutting at hay time, when labor was scarcely available for harvesting work, and to put men on to cut thistles was not possible. But much more could be done by some farmers than was done, for one farm and the adjoining half of the road was clean, while the neighboring farm and half of the road had quantities of thistles upon it. A deputation was appointed to wait upon the district council and support and encourage the council to greater efforts in destroying these thistles.

Salisbury, June 6.

PRESENT.—Messrs. Moss (chair), Sayers, King, Kuhlmann, J., Jas., and E. V. Harvey Laurie, Heier, McNichol, A. and C. Urlwin, Bagster, Richardson, Tate, E. and A. Whittlesea, Bayliss, Bussenschutt, Sexton, McGlashan, James, Shepherdson, Evers, Jenkins (Hon. Sec.), and two visitors.

HOW TO BEAUTIFY THE FARM.—Mr. R. King read a paper on this subject to the following effect:—"This is an age when pounds, shillings, and pence are counted, when we ask will any particular work on the farm pay, or is the thing worth the time and attention given to it. But there is certainly another side to the question: it is not always wise to consider the cost of every little thing we do on the farm to improve its appearance, and to beautify and make it look its best. In considering the question of how to beautify a farm the first question is the position of the farm house and buildings. Some of the sites on which the farm buildings are put are low-lying; others are on more elevated spots, where the buildings stand out more prominent and have a far better drainage. When

selecting a site for our houses we should pick a rise rather than a flat; but where there is no high ground it is wise to build our building foundations, say, a little higher and fill up around them to secure suitable drainage. Some of our farm buildings are too far from the road; others are too close, so that it is impossible to make a flower garden without taking a little of the highway in. When building I would select a site say three or four chains from the road, not closer, so that you can make a nice little garden of fruit and ornamental trees to make our farm appear beautiful and let the world know that we love beauty. When our buildings are too far from the road it takes up too much of our ground in roads, and also takes too long to get out on the highway. Further, it costs too much to make a decent track from the road to the house. Dealing with the surroundings of the house, we take first the front or the garden plot, which is often sadly neglected, for in place of ornamental trees or shrubs it is simply ploughed and a crop of wheat or barley, as the case may be, is put in. Sometimes it is used for grazing cattle, sheep, pigs, or fowls. I think we should keep the front plot or garden as nearly up to date as possible by planting useful trees, such as fruits or ornamental trees or shrubs. The drive or road into the farm should receive consideration in our spare moments. Each side of this path ornamental trees could be planted with advantage. There is nothing like a nice row of pine or sugar gums, pepper trees, or almond. This not only beautifies the place, but when we want to sell it enhances the value of our farm. I think we should take more interest in tree-planting on the farm. I think sugar gums are best for this district; they are easy to grow and will be useful for shade and shelter for stock, and when topped are also useful for firewood and other purposes. There is no difficulty in procuring these trees, as any person can obtain a supply free of cost by applying to the Government Forest Department. In planting, all there is to do is to plough the ground, say, 6in. or 7in. deep and break it down well with roller and harrows and cultivator. Take a sharp stick and make a hole in the place you intend planting; then insert your plant. I planted 80 in this way last June, and out of this number only three died. They have had little or no attention and have not been watered during the summer months, but some are 3ft. high. I also think we could plant a few of these trees in the corners of our fields. There are always four corners in the fields that are never cultivated in which we could put two or three useful trees. These would provide shade and shelter for stock, and would also beautify the appearance of the farm. Coming to the farm buildings and gateways, &c., I think it would pay the farmer to use the paint brush a little at times, not only as a polish, but as a preserver of our farm buildings and implements. I believe in painting and shelter for our farm implements. I do not like to see wagons, binders, and drills left out exposed to weather after they have done their work. There is a good old saying, 'There's a place for everything and everything has its place.' I prefer thin paint for woodwork, as it soaks into wood better than thick paint; but with thin paint it is necessary to give two or three coats. Last but not least are the gates and the gateways on the farm. There is no greater asset to the farm beauty than a neat gate well hung and nicely painted."

NEW SOUTH WALES.—Mr. J. Harvey read some interesting notes on his visit to the Sydney Show.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Arthurton, June 16.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. Lamshed (chair), Lomman, Welch, Rowe, Williams, Klein, Bull, Elix, Howlett, Crosby, Colliver, Stephenson (Hon. Sec.), and three visitors.

ANNUAL MEETING.—The Secretary read his annual report, which showed that nine meetings had been held during the year, the majority of which had been homestead meetings. In spite of the fact that members had had a considerable distance to travel, the average attendance had been fairly good. The Branch had been represented by two members at the two meetings of the Field Trial Society. Discussions on the following

matters had taken place during the year:—Manures, takeall, noxious weeds, sparrow pest, preservation of haystacks from mice, relative values of wheaten and oaten hays, and miscellaneous subjects.

Bute, June 6.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Cousins (chair), Trengove, Sharman, Matthews, A. and H. Schroeter, McCormack (Hon. Sec.), and one visitor.

NOXIOUS WEEDS.—Some discussion took place on the spread of various weeds. Mr. A. Schroeter mentioned that a plant known locally as “manure weed” had spread very much recently, and quite a quantity of good wheat had failed to realise top prices owing to the presence of this weed. The Canadian thistle was also reported to be spreading, but farmers generally were alive to the necessity for keeping this weed in check. [Samples of this weed should be forwarded for identification, as we have no record of the Canadian thistle being found in this district.—Ed.]

MARKETING AND HANDLING WHEAT.—Some discussion took place on the disparity between prices offered for stored wheat and for wheat held by the farmers. Members were of opinion that merchants should pay as much for wheat stored with them as for wheat delivered later in the year. Referring to the question of wheat elevators Mr. Hall expressed the opinion that local conditions, especially the large number of ports from which wheat was shipped, were not conducive to the handling and shipping of wheat in bulk.

Dowlingville, June 12.

PRESENT.—Messrs. Montgomery (chair), Watkins, jun., Mason, Mudge, Crowell, Lock, Powell, Lodge, Illman, H. A. Montgomery, Grove (Hon. Sec.).

NOXIOUS WEEDS.—The Branch decided to call the attention of the council to the prevalence of Bathurst bur and star thistle on public land close to Ardrossan.

HARROWING GROWING CROPS.—Mr. H. A. Montgomery had some wheat which had been drilled in about 10 days, and intended shortly to harrow it. Members thought he would run the risk of destroying the young plants. If he decided to do it, however, they advised leaving the harrowing as long as possible in order that the weeds might have a chance to grow and be killed by the harrowing. [In districts with a light rainfall it is sometimes an advantage to harrow the growing crop for the purpose of keeping the surface soil loose and retarding evaporation in addition to killing the weeds. This applies especially in soils which are liable to set down hard. Sometimes the points of the harrows are turned back slightly in order that the damage to plants may be reduced to a minimum. Where soil and climatic conditions render it advisable to harrow the growing crop, the damage done to a percentage of the plants is more than compensated for by the benefit to the whole crop.—Ed.]

Maitland, June 3.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. Opie (chair), Bawden, Hasting, Hill, Jarrett, Lutz, Tossell, and Pitcher (Hon. Sec.).

BEST DAIRY BREED FOR FARMERS.—Some discussion on a question from the question box—“Which is the best breed of cow for the small farmer to keep for milk supply?” Mr. Hill had a decided preference for the Shorthorn, and recommended obtaining a good bull of milking Shorthorn strain, keeping only the calves from the best cows and weeding out the inferior calves. Feed the cows well, provide sheds for shelter, rug them during the cold weather, and they will repay for the trouble. When past milking they are large enough to make fair beef. He had tried the Jerseys, but was not satisfied with them; he considered the Jersey a delicate animal. The majority of members favored the Jersey for the farm. Mr. Bawden said that he found the Jersey produced more milk on a given quantity of feed than any other breed, and the Jersey beef was the finest flavored he had ever tasted.

BIRD PESTS.—It was agreed that the sparrow was without question the most troublesome of birds in this district,

Paskeville, June 8.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. Wehr (chair), Pontifex, Goodall, Cowan, Forbes, and Palm (Hon. Sec.).

NOXIOUS WEEDS.—It was resolved to write to the Kulpara District Council, asking that steps should be taken to compel the destruction of various noxious weeds which had spread to such an extent during the past few years.

WEIGHING WHEAT IN BULK.—It was decided to suggest that the subject of the advantages to be gained by weighing wheat over the weighbridge instead of by the bag be placed on the agenda paper for Congress.

Pine Forest, June 6.

(Average annual rainfall, 13 in.)

PRESENT.—Messrs. W. H. Johns (chair), C. Schultz, G. Inkster, R. D. Barr, jun. (Hon. Sec.).

NOXIOUS WEEDS.—Considerable discussion took place regarding injury done by noxious weeds in the district. It was reported that a loss of grain of up to 4 bush. per acre was caused by the prevalence of saffron thistle. On the other hand some members considered that this plant was of value as fodder.

SEED AND MANURE TESTS.—Mr. D. Adams sent the following report of experiments carried out on his farm during 1910:—Seven plots of one acre each were drilled in on May 14th, and reaped on December 21st. Plot 1 was unfortunately reaped into the crop, so the result was lost. The following results were obtained:—Plot 2, ½ bush. wheat and ¾ cwt. super., yield 12 bush. 22 lbs. Plot 3, ¾ bush. wheat and 1 cwt. super., yield 11 bush. 55 lbs. Plot 4, ¾ bush. wheat and ¾ cwt. super., yield 12 bush. 53 lbs. Plot 5, ¾ bush. wheat and 1 cwt. super., yield 12 bush. 23 lbs. Plot 6, 1 bush. wheat and ¾ cwt. super., yield 13 bush. 53 lbs. Plot 7, 1 bush. wheat and 1 cwt. super., yield 15 bush. 27 lbs.

SEASON'S PROSPECTS.—The Hon. Secretary reported that so far the prospects were favorable to a good season. Although only half as much rain had been recorded this year as last there had been enough moisture without sufficient rain to retard seeding operations.

Yorke town, June 17.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Anderson (chair), Domaschonz, Jung, Koth, Warren, Correll, Bartram, Davey, and Rohrig (Hon. Sec.).

AGRICULTURAL MACHINERY AND IMPLEMENTS.—Mr. Correll read an interesting paper descriptive of the evolution of farm machinery and implements. He spoke of the improvement made in the various appliances used on the farm, from clearing the land and preparing the soil to sowing the seed, harvesting, and marketing the crop. He also mentioned that a present need was that of a good stone-gatherer, as none of the machines so far manufactured proved quite satisfactory. There was still room for improvement in some of the details of farm machinery, and perhaps the most widely felt need was an effective contrivance to catch the chaff from the complete harvester. This chaff was of considerable value, especially in new districts. When it was blown out over the paddock the weed seeds were distributed, and caused a lot of work to keep the land clean.

WESTERN DISTRICT.**Elbow Hill, May 13.**

PRESENT.—Messrs. Cooper (chair), Dunn, J. H. and P. Rehn, H. and L. Wheeler, Chلمان, Harvey, S. V., E. R., and G. F. Wake (Hon. Sec.), and three visitors.

BREEDING OF HORSES.—Mr. J. H. Rehn read an article on this subject from the *Journal of Agriculture*. Members agreed that the selection of the stallion was a very important

factor. Mr. Dunn spoke of the wisdom of keeping twice as many mares as geldings, as the mares could be worked almost as much as the geldings, and the value of the progeny was very considerable. It was difficult to obtain a good sire in the district. He considered it advisable, if possible, that farmers should have their brood mares examined by a veterinary surgeon so that they might be sure they were breeding from sound stock. Mr. Cooper said that the development of the horse depended a great deal on careful feeding after weaning. Mr. J. Rehn was of opinion that the best results were secured by breeding from mares when they were two years old.

PICKLING WHEAT.—In reply to a question regarding pickling solutions Mr. Cooper said he used bluestone for this purpose and was quite satisfied with it.

HARROWING AFTER DRILLING.—Members agreed that it was better to harrow after than before drilling if only once, as the harrowing buried the seed and helped to retain the moisture in the soil.

Elbow Hill, June 10.

PRESENT.—Messrs. Cooper (chair), S. and H. Tilley, H. and P. Wheeler, Bryant, Williams, Wake (Hon. Sec.), and two visitors.

ANNUAL REPORT.—The Secretary's report showed that during the year the following subjects had been dealt with:—"Fallowing," "Farming on Limited Capital," "Horses versus Sheep," "Stack-building," "Working of Fallow," "Campbell Dry Farming System," "General Farming," "Breeding of Horses," "Dry Bible," "Destruction of Rabbits."

CATERPILLARS.—The Hon. Secretary read an extract from the *Journal of Agriculture* of January, 1908, dealing with the destruction of caterpillars. Members had noticed a grub in the wheat crops in the district, and wished to know whether it was the same as the caterpillar mentioned in the paper. Mr. Wheeler's crop was damaged by them last year. He ploughed a deep furrow in front of them, and thus stopped their progress. The Hon. Secretary said several crops had been eaten to the ground by the grubs. [In all cases such as these specimens should be sent in to the department in a small box for identification. It is quite likely that the "grubs" were cutworms. If they cannot be killed by rolling with a heavy roller before they reach the crop, see page 633 of May, 1907, issue of the *Journal* for suggestions how to poison them.—Ed.]

Green Patch, June 19.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. F. Gore (chair), J. Sinclair, J. Sinclair, jun., P. and R. Sinclair, E. Chapman, E. M. McFarlane, W. Smith, E. J. Whillas.

NOXIOUS WEEDS.—After some discussion regarding the spread of noxious weeds this Branch decided to approach the local district council with a request that the provisions of the Noxious Weeds Act should be enforced.

Koppio, June 8.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. G. B. Gardner (chair), Thompson, Howard, M. Gardner, Brennand (Hon. Sec.).

DRAINING WHEAT LANDS.—Mr. T. Brennand read the following paper:—"On this part of Eyre Peninsula, where the rainfall is abundant in the winter months, wheat crops suffer very much from excess of moisture. It is evident that we shall have to pay greater attention to drainage than we have in the past. Very little has been done in the past in this way, but the time will come when we shall see the advantage to be gained by adopting means to carry off the water lying in pools on some of our best soils in the wet season. In ploughing the land it is a good plan to study the contour of the field and, if possible, run the furrows in such a way as to carry the water off. I am aware that it is not always possible to plough up and down a hill, as many ploughs do not do good work in that way, and it is heavy going for the team. Nevertheless, with a little thought

much can be done to assist the surplus water to escape. In cultivating the flats and gullies it is worth while to plough out a furrow at the bottom to confine the floodwater to one course if possible. Much can be done in a few hours with a spade in letting water escape from pools formed. Our flats and gullies usually contain good soils, and I am convinced that it is by reason the soil becoming too wet and cold that we get such poor results in very wet years. Covered drains are, without doubt, the best means of draining. Their construction has been explained in the *Journal of Agriculture*. There are plenty of stones on the land which could be put to use in making these drains. The fact is indisputable that wet land must be drained in order to get the best results." Members agreed that the drainage of Koppio lands was very necessary. The Chairman said the drains would be useful for carrying away water impregnated with magnesia, which salt existed in the low flats.

BARE SOIL PATCHES.—Mr. Thompson reported that he had a peculiar patch on his land which, though ploughed several times, always remained dry, excepting a very thin portion of the surface, even after good rains. No vegetation grew on it. The subsoil was red clay.

Lipson, June 13.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Provis (chair), Partington, McCallum, Barraud, Williams, Wishart, Brougham, and Potter (Hon. Sec.).

VETERINARY SURGEON.—Correspondence from Koppio Branch on the question of the Branches on Eyre Peninsula combining to secure a sufficient guarantee to induce a veterinary surgeon to settle in the district was received. Members supported the proposal, and it was resolved that members of each Branch should canvas their respective districts to secure the necessary number of guarantors.

COPRA CAKE FOR HORSES.—In reply to question Mr. Provis recommended giving only a very small quantity of copra cake at first in bran, increasing the amount as the animals got used to it.

CARE OF HARNESS.—Mr. Provis read a paper on "Care of Harness and Other Leather Articles" to the following effect:—It behoved the farmer to take every possible care of the harness, as leather goods deteriorate rapidly if neglected. All harness when not in use should be hung up carefully in a shed. It should be dressed with neatfoot oil twice a year at least. The harness should be well cleaned with hot water and soft soap, and dried before being oiled. When stripping is finished it should receive a good coat of oil on the outside and be put away from sun and rain. Other leather goods will repay care in this direction.

Lipson, June 10.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. Provis (chair), Oswald, Williams, Wishart, Brougham, McCallum, and Potter (Hon. Sec.).

STRYCHNINE FOR RABBITS.—Mr. G. Sinclair, of Green Patch, wrote concerning the poisoning of rabbits with strychnine, as follows:—Damp one pint of wheat; sprinkle this slowly with half a teaspoonful of finely powdered strychnine, stirring the wheat all the time. Take a handful of flour and dust this over, mixing it all together. Drop 8 grains to 10 grains in heaps along the rabbit runs or newly turned furrows. Members thought a smaller quantity of strychnine would prove effective. Mr. Wishart found it a good plan to poison well, then plough up the burrows, following this up with bisulphide of carbon in any that may be opened up.

PICKLING WHEAT.—Some discussion took place on this subject. A few members are trying formalin and fungusine, but the majority prefer a bluestone solution of about 1lb. to 10galls. of water. They had used this treatment for a number of years with good results and considered it advisable to adhere to it.

HAY-GROWING.—Mr. C. Provis read a short paper on the preparation of land on which a crop of hay is to be cut. When fallowing they should choose land most suitable for working the binder on. This should be worked down well and should be sown early in May, but not before rain falls. Put in 50lbs. of seed and 90lbs. of super. Sow Smart's Early, Huguenot, or Lovelock's Pet, or other early wheat. Silver King, Yandilla King, and Majestic make very good hay, but are too late for this district. As soon as seeding is finished roll the land and pick up any stumps and stones.

Miltalie, June 10.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. J. S. Jacobs (chair), Wilson, A. R. S. and J. A. L. Ramsey, J. P., I. W., and E. Story, Kobelt, W. G. and E. P. Smith, Alm, F. B. and T. Jacobs, Hier (Hon. Sec.), and four visitors.

ANNUAL REPORT.—The Secretary's report of proceedings during the year showed that 12 meetings in all were held, and the following subjects were dealt with, viz. :—"Care of Machinery on the Farm," "Protection of Hay," "Pioneer Farming," "Capons," "Seed Wheat," "Gardening," "Firebreaks," "Growing Oats for Profit," "Feed v. Breed," "Master and Man," "Improvements in Farm Machinery and Implements," "General Farmer and Bureau Member," and sundry other topics. In August, in conjunction with the Utera Plains Branch, a field trial of implements was held in addition to the ordinary monthly meeting.

PROBLEMS OF THE MALLEE COUNTRY.—The following paper was read by Mr. Kobelt :—"Of the many obstacles which the farmer in this district has to overcome probably the worst is the rabbit pest. We have the means of killing them or keeping them back. Netting is a thing that no farmer here can do without. If he wants to save his crops from the rabbits he has to put a good netting fence round his farm, and needs to sink the netting to an average depth of 4 in. To make sure that the rabbits are not burrowing holes underneath the netting he should go round the fence once a fortnight at the least and block up any holes made. He can then begin killing. The quickest and most up to date method of poisoning a large number of rabbits is the poison cart. This should be used after the first rain in summer when the feed is rather scarce. The rabbits will follow the freshly-rooted-up furrow better than at any other time of the year. After seeding they can be dealt with by means of the fumigator, traps, some may be dug out with the spade, and odd ones killed by the dogs. I believe that if farmers were more determined to kill rabbits in this way, and took the trouble to destroy a few burrows on the road between their neighbors and themselves, they would be able to keep down the pest a good deal more easily. Considerable time is wasted over carting feed and water for horses and other stock. Great inconvenience is caused to a farmer when he has not the necessary supply of hay and water. He has to stop his teams when they are most urgently required for other work to cart either chaff or water. Both of these hindrances could be overcome. Some farmers will cart water one summer after another, and very often have to go many miles for it, while during the winter months the water flows past their houses and stables in streams. If farmers took the time that they spend in carting water for one or two years, they would be able to throw out and build tanks or scoop dams big enough to supply them right through the dry months. If a man intends to stay on a farm for several years, building tanks should be one of his first improvements. Buying and carting chaff is a very poor game. Farmers should try to keep a bigger supply of hay than they generally do. As a rule the supply runs out in the busy time of seeding, when all the horses are expected to work their hardest. Chaff at the present time costs £5 per ton, and is fairly hard to get. It then follows that many horses have to do with less chaff than they need. If horses are not well fed they will certainly become poor and weak, and will be more liable to sore shoulders. Under these conditions the farmer cannot get in all the seeding at the right time, and it therefore behoves them all to grow enough hay to supply his horses with chaff right through the year."

Mitchell, June 10.

PRESENT.—Messrs. D. Green (chair), A. C. Brice, W. Sampson, O. and P. Green, F. Miller, H. Molloy, W. A. Dorward (Hon. Sec.), and one visitor.

ANNUAL REPORT.—The Hon. Secretary, in presenting the report of proceedings for the year, said that nine meetings had been held, and the attendance of members averaged 10. The following subjects had been dealt with :—"Fallowing," "Bureau Effectiveness," "Coltbreaking," "Covering Haystacks," "Destroying Rabbit Burrows," "Care of Farm Machinery," "Haymaking," "Water Conservation," "Farm Blacksmithing," and "Horse-breeding."

HORSE-BREEDING ON FARMS.—Mr. Dorward read the following paper :—"This important subject is one in which we should all take a great deal of interest. In these districts feed is difficult to secure for a few years, and farmers cannot spare the time to allow mares to rear foals. Nevertheless, every farmer should breed some foals as soon as it is possible, for there is a ready sale for them. He must remember that he has to replace

the majority of his present team in the course of a few years. The cost of horses to-day is very high. In this district, with the exception of carting, farm work is light, and the medium draught is the most suitable horse. Only the best of mares should be bred from. Use a good sound, compact stallion, and the resultant progeny will stand a lot of work, and when sold will realise big prices. Horses bred and reared together will feed together much better than a team purchased at a sale yard. This is an important thing on a new farm, as it is not easy to get a yard for each. With a team which has been reared together one yard and a large feeder will do until more accommodation can be provided. Mares in foal can be worked up to a fortnight before foaling, but not in boggy or slippery work at any time. This will prevent her from getting too fat, and as a result the foal will be much healthier. Every attention should be given the mare when near foaling, as often a foal can be saved and sometimes the mare, which otherwise would be lost. After foaling the mare requires plenty of good food and also shelter. The feeding of foals is a most important matter. No matter how well bred the parents may be, unless the foal has sufficient food when growing it will not develop into a useful animal. Foals can be taught to eat along with their mothers by having the feeder placed low so that they can get at the feed. When they have to be weaned they will then do better. This is the most important time in feeding foals. If they are allowed to fret it will be a great check to them. It is well to keep the mother right away when weaning. Where feed is slow at growing it is necessary to sow a few acres for green feed. Oats are one of the best foods for foals, as they form both bone and muscle. A good draught foal every year is better than an extra 50 bags of wheat, and the loss of time of the mare will not make that difference in the crop. If farmers were to rear their own horses they would find that there is a clear profit of £20 a head to be saved after allowing for time lost by mares, stallion fees, and feed for foal. The present price of horses is too high to enable a poor man to purchase horses for farming." Members, in discussing the paper, agreed that every farmer should breed horses for his own use, and recommended the breeding of heavy draughts.

Shannon, June 10.

PRESENT.—MESSRS. W. Proctor (chair), F. Proctor, Neate, (Gordon, Davie, Cronin, Inglis, W. M., L. B., and E. B. Smith, Glover, Wilkins, Carey, Cronin (Hon. Sec.), and eight visitors.

FOLLOWING.—Mr. Davie contributed the following paper on "Fallowing":—"We fallow to produce certain definite results, and the practice in different districts will vary according to the conditions of soil, rainfall, &c., under which one is working; but the different methods all have the same objects in view. The objects of fallowing are soil improvement, weed extermination, conservation of soil moisture, especially in the drier districts, and preparing ground so that large areas may be sown with the minimum of labor. The last consideration is only a secondary one, excepting, perhaps, where new ground is being worked, as after the first few years fallowing is necessary for profitable wheat-growing under present conditions in Australia. Taking fallowing as an aid to soil improvement, we might first study the conditions which tend to produce the best results. Work the ground early in the winter, and under ordinary conditions leave it rough during that season of the year, taking care to work it before it cakes hard in the spring. This method of procedure for the winter months is followed because the earlier the ground is broken up the more rain will fall on it whilst it is in that state, and rain is one of the greatest of the natural agents which produce available plant-food. The rougher the ground is left the greater the surface exposed to the action of the air, which is another indispensable agent for bringing about chemical changes in the soil. I might state just here that soil improvement by fallowing consists, not in adding plant-foods to the soil, but in making available for the use of plants a small percentage of the large quantities locked up in the soil in an insoluble state, and therefore useless to plants. All the necessary foods are present in almost any soil, and it is according to the quantity of each which is available or soluble that the fertility of a soil depends. A very fertile soil has in it large quantities of available plant-food; a barren soil, none; yet each may be of the same composition. Fallowing, then, exposes fresh soil to the action of the various natural agents, such as rain, frost, air, &c., which assist chemical changes. It follows, therefore, that the greater the depth of ploughing the greater will be the total area of feeding ground for each plant. Of course, when going down to any depth in ploughing, it is usually done gradually, as too much new land turned up at once may cause an excessive supply of available plant-foods, which, being soluble, could be washed down into the subsoil or

carried to other parts. Deep ploughing is always safe in deep soils; but where the subsoil approaches very near to the surface great care should be exercised in bringing it up. Land has been made unprofitable for many years simply by bringing up too much of this unsweetened soil at once; and although in time it will be acted on and mellowed down, you must remember that chemical action in the soil is very slow, and take care not too make too great a demand on the forces which are at work for your benefit. Another reason why the ground is benefited by fallow is that if properly worked the conditions are such as will promote the greatest activity of the bacteria which produce such far-reaching results in a soil. They must have air, warmth, and moisture to a certain extent, and these are procured by keeping the ground loose and thus well drained, as all the surplus water will pass into the lower layers and the surface will not be cold and waterlogged. One of the chief reasons why we fallow is to replenish the supply of nitrogen; and as these bacteria change it into the desired form it is important to have the land in a condition which will facilitate their operations. All the after-cultivation necessary for soil improvement is given to procure the other objects of fallowing—weed extermination and water conservation. The weeds are allowed to flourish in the winter months when the land is lying idle, but as soon as the spring arrives it should be the object of the farmer to immediately destroy these robbers of the soil. Procuring a perfect condition of soil for seeding is the ultimate goal in this work; therefore, it would be unwise to work deeply and thus destroy your firm seed bed, which is so necessary for wheat-growing. Rain is the great consolidating agent of the soil, and you cannot depend on that during the summer months. The first working, however, being farthest away from seeding and before the rains are all over, can be a little deeper than the succeeding ones, which should be deep enough and frequent enough to kill all weeds in a wet district, and to keep a mulch of fine earth on the surface in a dry one. A thing to guard against is working fallows at unsuitable times. If worked when dry, the physical condition seems to be affected, giving poorer results; and it has been found that takeall thrives best on dry-worked land, which is very loose. This disease infects the ground, and therefore those conditions suitable to its propagation and growth should be avoided. Weeds act as the hosts which carry the takeall over the months which intervene between the wheat-growing seasons, and this is another reason why the fallow should be kept clean during the summer months. As regards farming in new mallee country, the plough is the main clearing medium, and for that reason I would use it to a good depth wherever possible without impoverishing the soil. I consider that any fallow should be worked at least twice, even in a wet district, and in a dry one, of course, frequent working is absolutely necessary. I think it will be found advantageous to cross-work the ploughing, and then cross-cultivate. This will produce a good seed bed, and where a disc implement is used will cut many more shoots. On cleared land, after the first working, harrowing may be all that is needed; but the nature of the implements used and the methods must vary, and are unimportant as long as the objects of the work are gained." In the discussion which followed Mr. Carey was of opinion that land should be fallowed fairly deep in order to tear out as many roots as possible. Mr. Proctor agreed that working fallow in a dry state had a tendency to encourage takeall.

DISC IMPLEMENTS.—In reply to a question, Mr. Davie said that it paid to use disc implements, as a considerable saving was effected in brush-cutting and in levelling the ground.

Utera Plains, June 10.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Ramsey (chair), R. H., T., and H. G. Hornhardt, West, Venning, J. and M. Abrook, Bilney, A. and G. Barber, Hill, Sinclair, Guidera, Brannah, Stephens, Gale, Naughton (Hon. Sec.), and several visitors.

ANNUAL MEETING.—The annual meeting, which took the form of a social gathering, was held in the Salt Creek School. The Hon. Secretary's report showed that nine meetings had been held with an average attendance of about 19.

CLOCKSPRING PLOUGHS.—This subject was dealt with in the following paper, by Mr. Stephens:—"About 25 years ago I used one of the first four-wheeled ploughs that was made in the North. It worked with both bridle and weights, and was very light in draught. With the weights on there was little pressure required on the bridles, thus making it easier on the horses. It was very clumsy looking, but four horses worked it with ease. The country in which it was worked was pine and bush, not mallee. The six-furrow release action clock spring plough which I now have is a light running imple-

ment. I am working it with seven horses, and with this have ploughed nearly 10 acres in a day of 8½ hours. The plough jumps the stumps very easily, and enters the ground quickly after jumping. It barely raises the swings, and does not jar the horses. The only jar the clock spring gives is when it hangs in a stump or root, not bad enough to pull you up or pull the stump out. I have not been hung up more than a dozen times since I started ploughing. I think the clockspring would pull out stumps better than any bridle plough. When any obstacle gets on the share I find no difficulty in lifting the plough up to let the obstacle go, as there is no pressure on. In my opinion the plough could be improved. For instance, a bar could be attached from the lever to the head of the plough to raise the front out of the ground. The lever at present only raises the back of the plough. In turning around one needs to be careful to avoid striking stumps, or he may bend the body of the plough. There could also be an improvement in the draught. There is a clamp with a short piece of iron from the draught to a bar which steers the wheels. This short piece of iron works like a hinge that allows the draught to swing up and down, and in turning around the ends it turns under the opposite side. In order to prevent this I put a short piece of chain on which stops it from turning under. A footrest could with advantage be fixed on the footboard, as ones feet are apt to slip off when in the act of pulling the lever down." In the discussion which followed the reading of the paper, Mr. Hornhardt said clockspring ploughs were better than bridle ploughs, as they did not gather rubbish, and in rough, stumpy ground they were not so hard on the shoulders of the horses. Messrs Abroth and Stephens thought the springs were not durable enough, and the Chairman said that stumps sometimes caught in the toe of the plough.

Yadnarie, June 10.

PRESENT.—Messrs. Brown (chair), G. A., T. C., C., and F. Dreckow, Kruger, Weiss, F. W. and A. Jericho, Spriggs, Mowat, Deer (Hon. Sec.), and seven visitors.

DESTRUCTION OF VERMIN.—Mr. W. F. Jericho read the following paper on this subject : —"In this district, where rabbits and wallabies are a great trouble, all farmers should netting-fence their farms. It is best to fence when the ground is wet. In putting up a new fence a three or four furrow plough can be used. After marking a straight line, one man leads the horses and another, with a foot steer, can guide the plough straight. Netting should be buried 4in., and should be at least 3ft. above the ground. If two barbed wires are put over the netting, each 6in. apart, with wire hooks about 4ft. apart, it will also keep wild dogs back. A 2in. mesh is quite small enough, as only very small rabbits will go through that. When rabbits work under the netting it is best to set a trap and not fill in with earth and stones. The Griffiths rabbit trap with Good's patent attached, when set firm in the ground will seldom miss a rabbit. Traps should be set firmly in the ground for catching any kind of animal." Members considered that 36in. x 1½in. netting was superior to 42in. x 2in. for vermin-proof fencing.

BARBED WIRE.—Replying to a question as to the best way for one man to unroll barbed wire, it was suggested that a fork of mallee or an iron frame be procured. Bore two holes in the end of the fork, run a pin through as a spindle and pass it through the bundle wire between the two prongs of the forks; put an iron pin through the single end of the fork to use as a handle and drag the roll of wire along the ground, the wire unrolling as the operator moves on.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Lameroo, April 14.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. J. Trowbridge (chair), Cameron, Sinclair, Spicer, Needs, Wray, W. J. Trowbridge, F. W., and C. R. Eime, Hannan, Gibbon, Messenger, and Koch (Hon. Sec.).

PURCHASE OF CORNSACKS.—Mr. Needs read the following paper :—“The present system of purchasing cornsacks is to my mind very unsatisfactory to the farmers, and the time is come when steps should be taken to have a clear understanding as to who reaps the benefit of the difference in the price the farmer gets for his cornsack and the price he pays for it. The average price paid for a cornsack is 5d., and when that sack is filled with wheat and marketed the farmer gets the value of its weight only, which, with wheat at about 3s. per bushel, is approximately a penny halfpenny per bag. There is, therefore, a loss to the farmer of 3½d. per bag. Take an instance—The farmer buys 10 bales of cornsacks at a cost of £82. When he has filled them and taken them to market he receives their weight value, viz., £18, and so suffers a loss of £44 on the deal. An approximate calculation will show that the loss on sacks alone to the farmer in this State amounts to about £250,000. The merchant receives the benefit of this huge difference—not the farmer; and it is time that the farmers thoroughly discussed the matter to appoint a committee to attend the next Congress, with proposals for the adjustment of this matter. Some of the merchants, in giving evidence before the Wheat Commission, stated that wheat sold in bags in England was worth 6d. per quarter more than wheat in bulk. The farmer pays the piper at this end and the merchant chooses the tune at the other end. The man that pays the piper ought to choose the tune.” Considerable discussion followed. Members considered that it was reasonable for farmers to buy the bags in which to market their wheat. Nevertheless, some of those present desired to see the matter further discussed.

Lameroo, May 13.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. J. Trowbridge (chair), Cameron, Mead, Sinclair, F. W. and C. R. Eime, A. G. Trowbridge, Dunstone, Leckie, Gibbon, Wray, Ross, Thyer, Spicer, R. B. and A. J. A. Koch (Hon. Sec.).

WHEATS FOR DISTRICT.—Mr. E. T. Wray contributed a short paper, setting forth the varieties of wheat which seemed best suited for the district. He had grown Gluyas, Steinwedel, Newman's Early, Federation, Bluey, Budd's Early, Yandilla and Silver King. Of these Bluey, Yandilla King, Budd's Early, and Federation gave most satisfaction. Steinwedel did not stool out well, and it shook out too easily. Newman's did not stand dry weather very well, and showed a tendency to go down rather easily and shake out; nevertheless, it was a nice threshing wheat. Gluyas was a hard wheat, and weighed and yielded well. It went down badly, and was rather tough to thresh. It was not a good milling wheat; nor was it a good hay wheat, as the straw was too hard. Yandilla King did well in the district. It could be left late without loss of grain; it made nice hay, but was rather slow growing and hard to thresh. Bluey was a really good wheat to grow, one of the best for hay, and, although not rust-proof, during the season just past was not affected as badly as Yandilla King: when sown in good time it yielded well. Last year he had about 80 acres of this variety on new land, just cultivated and drilled in, and it averaged 17bush. per acre. It grew to a medium height, was well headed, and easy to thresh. Though not a good wheat for hay, it weighed well. Federation practically always gave satisfaction, and on fallow land gave bumper yields, but it was not rust-proof. Having been bred for grain production, it was not a hay wheat. In the discussion which followed members favored Yandilla King, Silver King, Walker's Wonder, Gluyas, and Federation as satisfactory varieties and good yielders for this district.

BLEACHED SEED NOT PICKLED.—The Hon. Secretary wished to know whether the statement that it was unnecessary to pickle bleached seed wheat was correct. [When the wheat has been bleached there is certainly less likelihood of the crop grown from such seed being bunted or smutted for the reason that the large proportion of the spores may have germinated. On the other hand, all the smut balls are not broken, and all the spores do not germinate. It would, therefore, be a mistake to forego pickling the seed. The simple insurance against smut costs so little against the loss likely to accrue from the sowing of unpickled grain that it is scarcely good business to omit pickling.—Ed.]

Lameroo, June 10.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. J. Trowbridge (chair), Jericho, Blum, Shannon, Thyer, Ross, Kentish, Eime, S. G. Trowbridge, A. J. A. Koch (Hon. Sec.), and one visitor,

RAINFALL VALUES.—The Hon. Secretary read the following paper on this subject:—
 “My object is to try to make plain the relative values of a 10in. and a 20in. rainfall, and why it becomes necessary to practice a system of dry farming in centres blessed with even a 25in. annual precipitation. In a report on dry farming in America, furnished by the Surveyor-General a few years ago, only in two or three States dealt with was the average rainfall less than 10in. annually, and in most cases it ranged from 15in. to 25in. per year. Under our climatic conditions any average farmer can grow payable crops on a 16in. rainfall, provided that it falls in the right time. It was my good fortune last March to be invited to attend the first inter-State Dry Farming Conference held in Australia, and to meet there both farmers and Government officials from each of the three eastern States, in addition to the departmental officers and two Northern farmers from our own State. The delegates were unanimous in the opinion that we could grow more wheat in South Australia on less than a 12in. rainfall than could be done in the other States; and, so far as Australia was concerned, no hard and fast rules for cultivation could be made. In New South Wales alone, wheat-growing areas had a rainfall averaging from 14in. at Coolabah to 20in. at Cowra, and this was by no means the highest. The latter is one of the best wheat districts in the State; while Coolabah, 100 miles beyond the recognised wheat belt, with 14in. of rain falling somewhat irregularly and uncertainly, is considered quite unsafe for wheat-growing. Mr. H. C. L. Anderson, M.A. (Under Secretary for Agriculture in New South Wales), says, ‘I would call all New South Wales dry which is elevated less than 1,500ft. above sea level and has less than 25in. of rain.’ It was difficult for the visitors to realise that we could grow wheat on less than 16in. of rain. For many years our northern farmers have grown wheat with less than 16in. of rain, and have found the problem a less strenuous one than those in New South Wales who have, in many instances, a 25in. rainfall. The reason for this is that evaporation is an important factor. No records have been kept of evaporation tanks in South Australia, but it is well known that it is not nearly so great as in New South Wales or Queensland. It is therefore apparent that a South Australian farmer would not gain a very decided advantage by leaving a 14in. rainfall here and going to a 20in. or 25in. district in New South Wales. In Victoria the problem is more like our own. They enjoy a long coastline and not a very dry interior, excepting a few places in mallee districts, where the rainfall is even less than our own. To estimate the value of a given rainfall we must, therefore, make ourselves acquainted with the locality, judge the quality of the soil, and satisfy ourselves as to whether it will both absorb and retain the moisture. If possible, get a rainfall table and see whether the rain falls mostly during the growing period, and whether it is of a torrential or steady precipitation; 20in. of heavy pouring rain, coming with thunderstorms, is not nearly so good as 8in. of steady soaking rain which the soil has time to absorb. A great portion of New South Wales and the greater portion of Queensland are very subject to this heavy rain. We are unable to obtain a lot of the above information on account of the lack of rain gauges faithfully kept in many of the new districts that will be open to application during the next three years. This information should be obtainable to help intending applicants to more accurately judge what their experience is likely to be. I took some soil samples from here to the Conference, and read a paper on ‘Wheat-growing in the Pinnaroo District.’ The soils were critically examined whilst I was reading the paper, and the delegates were astonished to find that in what they termed light soils we could grow as much as from 20bush. to 30bush. per acre on a rainfall not exceeding 18in. or 19in. annually. I think the South Australian farmers practice a system equally as good as the Campbell system, with modifications to suit each particular climate and soil. If we want to retain our present high reputation, we must not only be practical but scientific, and if scientific then we will realise and use to the very best advantage every inch of the annual rainfall that we are at present blessed with.” In discussing the paper, Mr. Shannon was of opinion that applicants for land should not be guided solely by the rainfall. Quality of soil and other factors had to be given due consideration. Mr. E. J. Trowbridge stated that rainfall values could be greatly enhanced by the thorough cultivation of the soil.

Parrakie, June 3.

PRESENT.—Messesrs. F. J. Dayman (chair), Beelitz, Schmidt, Gravestocks, Diener, H. and O. Heinzel, Lee, Randall, Brinkley, A. Dayman, Hall (Hon. Sec.), and four visitors.

GRADING SEED WHEAT.—Mr. Brinkley read a short paper on this subject. He wondered why the majority of farmers did not use the seed-grader. He was sure that once they graded their seed wheat they would not sow ungraded seed. The removal of weed seeds

and small grains and other impurities not only made the drill sow the grain more evenly but the crop came up more regularly. The weed seeds and small grain should be boiled or ground and fed to stock instead of being sown to make the land dirty. Some farmers with no experience of the grader said the process was too slow; but there was nothing in this, as two men could clean, sew up, and stack 30 bags of wheat in a day. The question of cost of the machine could easily be overcome by four or five farmers combining to purchase, as they would each only require it for a few days each season. Most of the members strongly supported; it paid every time to sow the best seed they could get. Mr. Randell did not think it would pay a farmer to buy a grader, as they could buy graded seed of almost any variety from Roseworthy College and from the Agricultural Department. Mr. Gravestocks said he cleaned his seed wheat over the drake screen, as this took out all the drake and put through twice as much in a day as the grader. The Hon. Secretary did not consider the drake screen compared with the grader for effective cleaning. It was surprising the amount of inferior stuff the grader would remove from what would be considered a good sample of wheat.

FENCING.—In reply to question as to most serviceable fence to erect in this district, Mr. Diener advocated T-iron posts 1½ in. in thickness put 1 ft. in the ground, at distances of 12 ft., with good wooden strainers 120 yds. apart. He would use two barb wires, or one barb and two plain wires. Such a fence was easy to make sheep-proof whenever required. Messrs. Beelitz and Schmidt would prefer to use iron posts a little lighter but closer together—say 9 ft. apart. Mr. Dayman said that with plain wire the posts should be closer together than was necessary if two barb wires were used.

Sherlock, June 17.

(Average annual rainfall, 15 in.)

PRESENT.—Messrs. C. J. Osborn (chair), A. Osborn, Nock, J. C. and A. Tonkin, Coombe (Hon. Sec.), and 25 visitors.

ANNUAL REPORT.—The Hon. Secretary, in presenting the report, said:—"From every view-point the closing year has been the most successful since the inception of the Branch. The attendance has improved, and the interest and enthusiasm has greatly exceeded either of the preceding years. This is the first occasion on which a meeting has taken the form of a social gathering, and I would suggest that it be made an annual affair. A certain amount of responsibility rests upon each member of this Bureau; but I am compelled to admit that some members do not recognise this fact. They attend irregularly, and when they do attend they may say a few words or they may not, and that is the extent of their usefulness to the Branch. To make it a success, members are required who are enthusiastic, will volunteer to give papers, or suggest subjects for discussion, who will attend regularly, and who will have the interests of the Branch at heart. When the whole of the work is restricted to a few members it is very difficult to maintain a high standard of success. In all, 10 meetings have been held, with an average attendance of eight members and seven visitors. Papers have been given on 'Sheep on the Farm,' 'Comparison of Farming in the North and Locally,' 'Breeding Poultry for Egg Production,' 'Harvest Operations,' 'Fertilisers,' 'Selecting and Grading Seed Wheat,' and 'Pickling Seed Wheat.' Discussions have also taken place on other subjects."

Waikerie, June 19.

(Average annual rainfall, 9 in.)

PRESENT.—Messrs. Odgers (chair), Lewis, Burton, Modestach, Burroughs, Rogers, Jones, and Green (Hon. Sec.).

FRUIT TREES FOR MURRAY VALLEY.—Some discussion as to the best fruits to grow in this district followed the reading of an article from the *Pioneer*. Mr. Burroughs considered apples would not pay to grow in the Murray Valley, as the summer was too hot and the fruit scorched badly. Mr. Rogers thought Duchess pears could be profitably grown. Mr. Jones said that as currants and sultanias gave a comparatively quick return, and as they did not cost so much to plant as deciduous trees, they were preferable for new growers.

Wilkawatt, June 10.

PRESENT.—Messrs. D. F. Bowman (chair), Altus, Tylor, Sorrell, Ivett, Arhns, Harvey (Hon. Sec.) and four visitors.

HORSE COLLARS.—Mr. W. J. Tylor read a paper on this subject as follows:—"This item on the farm is sometime a rather neglected one, but I think should rank first on the list, and should be considered very carefully. All working horses should have a good fitting collar, else disaster to the horses' shoulders results. I prefer the basil-lined collar to the check, as the cloth soon rots with perspiration, whereas you can wash the leather after each day's work, ensuring a clean collar for next day's use. You can also keep it very soft with the use of a little neatsfoot oil, and this, I think, is a very important thing, as a collar that is put on a horse lined with dirt and scabs will soon play havoc with the shoulders. All collars should be cleaned before use, as there is always a collection of dirt and dried sweat on the linings. A collar should fit close to the neck on both sides, and fairly well at the pipe, but not close enough to cause the horse to choke down while working. When a sore appears on the shoulders the collar should be examined, and if it is clean then soften the place by hammering with a round piece of wood, and if this will not help the sore to heal, then use the knife on the collar and ease some of the straw away so as to allow a hollow where the sore part works. Some people have a great objection to cutting the collar, as they say it spoils them; but I believe a horse's shoulder is of more value than the lining of a collar. A bran bag is often placed between the collar and shoulders when there are sores, but I do not altogether like this method, as unless the bag is washed or renewed frequently it becomes hard, and does just as much harm as an ill-fitting collar. I believe a more desirable practice is to use a piece of oilcloth. The cloth can easily be washed after a day's work. I have in use a collar which is made of a spring steel, which I believe is better than any of the collars and appliances for sore shoulders. I have used it over two years on one mare which had very bad shoulders, and I could not get them well, although I got the saddlers to ease her collars, and immediately after putting this collar on the sores gradually became better, although working all the time, and I have never had a sore on her till this week; I notice there is a small sore about the size of a florin. The collar weighs 15lbs., and the check-lined collar the same size weighs 25lbs. with harness. They are a little dearer in price, but I think soon repay the extra expenditure." The Hon. Secretary said he used false collars made out of two bran bags folded lengthways with a cut half way across in the centre to fit the shoulders properly. This was neatly stitched and fitted with cords to tie them together at the bottom. He had used these for two years, and had not had any trouble with sore shoulders. When these got damp they could be turned, and it was a simple matter to thoroughly rinse them occasionally.

SOUTH AND HILLS DISTRICT.**Dingabledinga, June 9.**

(Average annual rainfall, 30in.)

PRESENT.—Messrs. F. DeCaux (chair), A. and F. DeCaux, Manning, and Chenoweth (Hon. Sec.).

HOMESTEAD MEETING.—Members visited the property of Mr. Griggs, at Prospect Hill. Mr. Griggs had an engine so stationed that he was able to cut chaff, wood, and also the timber for fruit cases, pear trays, gates, &c. Members inspected a device for working the plough close up to the trees, and the practice of budding and grafting was demonstrated. The kiln for the drying of pears, apples, and quinces was of very simple construction. By removing a few bricks it could be used as a smokehouse for bacon-curing. The orchard, which was of a fair age, was situated on a hillside, too steep to admit of easy cultivation, spraying, and picking. Mr. Griggs' new orchard was also inspected, but members thought the subsoil too sour for first-class fruit. The varieties planted included Rome Beauties, Jonathan, Spitzburg, and Rokewood. Mr. Griggs stated that he would not plant any more of the lastnamed variety.

Longwood, June 24.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. Hughes, J. and W. Nicholls, Glyde, Oinn, Pritchard, Blakley, Roebuck, Vogel, Furniss, Coles (Hon. Sec.), Mr. Geo. Laffer of Advisory Board, and one visitor.

The meeting was held at the homestead of Mr. W. Nicholls.

ANNUAL REPORT.—The Secretary read his report of the year's proceedings. Eleven homestead meetings had been held. The Hills Conference was attended, typical orchard visited, and a demonstration of labor-saving implements was held. A committee had been formed to carry out systematic experiments with a view to adding to the knowledge of members regarding the results attending the use of fertilisers. During the year the following subjects were dealt with:—"Manuring Experiments," "Mixed Farms in the Hills," "Renovating an Old Orchard," and sundry other matters.

TREATMENT OF APPLE AND PEAR TREES.—Mr. Geo. Laffer gave a short address at the invitation of members. He said it was beneficial in planting to spread a little bonedust or farmyard manure at the bottom of the hole prepared for the tree. The tree should be planted with the roots directed downward, the earth pressed firmly on the roots and a little more manure sprinkled in alternately with the layers of earth. In shaping the tree, the first recommendation was to keep it low. During the first three years prune to get it into proper shape. During the second period of three years the tree should scarcely be touched. Afterwards, to obtain the best returns in fruit, pruning must be light. Attention should be given to keeping the tree open and to thinning to prevent it from carrying crops that were too heavy. He was convinced that it was desirable to prune so as to obtain a balance between root and branch. Where pruning was unduly severe the tree in the struggle to restore the equilibrium was occupied in replacing its lost wood and consequently produced very little fruit. He did not favor summer pruning, contending that it resulted in clustering rather than spur fruiting. Pears required less manure than apples. Varieties of quinces recommended by Mr. Laffer were Synmura, a good cropper and keeper, and Pineapple quince, a splendid fruit for canning. Members appreciated the information given. After tea, which was kindly provided by Mrs. Nicholls, an adjournment was made to the Longwood Institute, where addresses were delivered by Mr. Laffer and Mr. Curtis of Forest Range, upon the aims of the Fruitgrowers and Market Gardeners' Association.

Meadows, June 12.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. G. Ellis (chair), Catt, Brooks, Morriss, Smith, Nottage, A. Ellis, Kleemann, Olsson, and Bertram (Hon. Sec.).

ANNUAL MEETING.—This being the annual meeting, the Hon. Secretary presented his report, as follows:—Twelve meetings had been held, and there were 19 members on the roll. The average attendance during the year had been about 18. The under-mentioned subjects had been dealt with:—"Land and Rainfall," "Grafting and Budding Fruit Trees," "Part Management of Dairy-farming on Small Holdings from 80 to 100 Acres," "Improving Fruit Trees," "Destroying Rats," "Farm and Home," "Management of Brood Sows," "Grooming Horses," "Rainwater Washing of Sheep," "Forestry," and miscellaneous matters. The Secretary considered that the attendance of members should improve during the coming year. The value of the Bureau and of the *Agricultural Journal* should stimulate members to greater interest in the Branch, and larger attendance at meetings would increase the effectiveness of the work done.

FORESTRY.—Mr. H. H. Kleeman read a paper in which he pointed out that South Australia, as in many other movements, was the first State of the Australian group to establish State forests. In 1870, the late Mr. F. E. H. W. Krichauff persuaded the House of Assembly to call for reports on the best size of reserves for forest purposes, where they should be made, the best and economical means of preserving the native timber on them, and of planting and replanting the reserves as permanent State forests. Three years later the Forest Act became law, and a bonus was offered of £2 per acre of land which on

forest trees were planted and maintained for a period of five years. Private landowners made little effort to earn the subsidy, so, in 1875 a Forest Board was appointed, but this was abolished in 1882 and the present system established. In 1908 the total area of our forest reserves comprised about 160,000 acres, of which about 15,000 acres were planted. Up to the same period 7,000,000 trees have been distributed to corporations, district councils, schools, and to private individuals. Our worthy Conservator of Forests (Mr. Gill) remarks—"There are thousands of acres in the State suitable for pine-growing now carrying inferior timber of practically no value or scrubby vegetation. The cost of clearing, fencing, and planting varies according to circumstances; but, speaking broadly, a plantation of pines may be established under suitable conditions and maintained till it represents the gross value of £200 per acre at a cost varying from £5, under the most favorable conditions, to £10 per acre, where more work is needed to prepare an acre for planting." There are a number of State forests in different parts, and in one in our own locality, viz., the Kuitpo Forest, in which about 500 acres have already been planted and a large additional area will be set out this year, a number of varieties of trees are being tested, the pines up to the present having done best. I would like to see further experiments made with both the cork oak and the jarrah of Western Australia in this locality. In some localities it would pay to grow the sheoak, which is valuable, not only on account of its timber, but also as a forage tree. In the West Coast districts this tree is rapidly dying out. It is a shallow-rooting tree, and many are blown down, while the rabbits and other stock devour the young trees. Without proper protection to ensure natural regeneration or by planting, the sheoak, in the course of a few years, will become scarce. In many parts of the State large quantities of wood are being burnt in clearing operations for agricultural purposes, and at the same time in the cities firewood is scarce and high-priced. If the Railway Department could make special low rates for wood during a season of the year it would be of great advantage to all concerned. Individually, we cannot do much in the matter of tree-planting, as the time of waiting for any return is too long; but as Branches of the Bureau we can advocate greater activity in this direction on the part of the State. The writer then went on to say that he would also like to see a vigilance committee appointed by the Branch or in conjunction with other bodies to attend to tree-planting, &c. The foresight of the present generation in the matter of forest culture would have a very important bearing on the welfare of the future generations. In discussing the subject, Mr. Smith said that sheoak timber made first-class wheel spokes, and could be better utilised than was the case at present. With regard to jarrah, he considered the Government should experiment by planting this timber in deep gullies, where, he believed, it would thrive. The Chairman doubted if jarrah could be grown in their district, but, together with the Wirrabara district, it was the home of the pine. Mr. J. Catt was of opinion that nonlark would thrive in their locality.

Mount Pleasant, June 9.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. Giles (chair), Royal, Phillis, Miller, Thomson, Tapscott, Matland, Vigar, and Maxwell (Hon. Sec.).

ANNUAL REPORT.—The Hon. Secretary's report showed 10 meetings held during the year, an average attendance of seven members, four papers read, and many subjects of practical interest discussed.

NOXIOUS WEEDS.—Discussion on the destruction of weeds took place, and it was decided that members do all in their power to assist in this direction.

INCREASING PRODUCTION.—Mr. Thomson read a paper on "Ideals for Farmers" to the following effect:—"All men of all parties agree that more population and closer settlement is indispensable for the future welfare of the Commonwealth. How can we, as members of the Agricultural Bureau, best encourage this necessary closer settlement? Speaking for myself, I can do little, owing to want of knowledge, capital, courage, and industry. Want of knowledge is not limited to myself; good crops being the exception in this district for years past. I consider an experimental farm run by the Government, even at a moderately heavy monetary loss, in the hills district would be money well spent. The Roseworthy farm has been of great worth to the farmers of the more or less dry North; so a farm in the hills, where farmers could see what could be produced from 100 acres or 200 acres under proper intense cultivation, would be of great value, and would help to save our hills districts from becoming a mere cattle or sheep run. The value

to the State, if all the hills districts from Victor Harbor to Truro were occupied by skilled farmers with holdings of one, two, or three hundred acres and putting the land to its best, could not be estimated. A farmer's duty is to produce from the soil the varied products that are necessary for the support of the people. Money-making is not the first duty of the farmer; certainly he must make a living or retire. The question I am trying to lead up to is, is the present ideal of farming a high or good one? Judging from a national standpoint it is neither one or the other. In every district of the State large estates accumulate. Large farms have many hundreds of acres of crop put in with as little cost as possible. Men who started with a 500-acre farm hold from 5,000 acres to 10,000 acres, which is mainly, if not altogether, devoted to grazing; so the outcome is not higher farming, but the gradual reversion to sheep walks. A trend so persistent and universal will not be stopped at once. All the State Governments are building railways to open up new country, and are thereby encouraging the earth hunger in the attempt to satisfy it. What should be the ideal of a farming community? The increased production from the soil, improved farm buildings, more homes, better accommodation for workmen, and shorter hours of labor, which latter should be possible by labor-saving implements. Farming in the future will not be done with less machinery but more. What we should aim at is not large farms, but well-titled ones, manned by skilled labor, using the best machinery possible, and the outcome would be the increase of all true wealth. The present trend for land estates to increase in extent and value is the natural outcome of many factors. One of them is our splendid climate, which permits all stock to be grazed in the open all the year round. The continual and natural increase of the land value decade by decade, if used or not, is caused by the increase of population, improved system of cultivation, the continual improvements in machinery and means of communication by railways, roads, and steamer. Much good will be done if small holdings can be made more comfortable to the workers of them. Let it also be fully realised that all workers are worthy of their hire. Also that other saying, 'He that does not earn his living steals it.' It may be said that these are mere platitudes. Quite true; but generally lost sight of. It is usual to class farmers as conservatives, and bound to resist all change. I beg to differ. They should be open to all advancement, whether in politics, farming, moral or intellectual thought."

Port Elliot, May 20.

(Average annual rainfall, 20½ in.)

PRESENT.—MESSRS H. B. Welch (chair), H. Welch, Chibnall, Brown, Barton, Green, Pannel, and Hargreaves (Hon. Sec.).

FRUIT-PULPING PLANT.—Members thought they were too far away to take any action in respect to establishment of a Government pulping plant.

VEGETABLE-GROWING.—Mr. H. B. Welch read a paper on this subject to the following effect:—"I wish to bring under notice of our gardeners the opportunities they are missing in this district by not growing enough vegetables for local use during the holiday season. As you all know the number of visitors to the southern towns is increasing by leaps and bounds, and at times there is quite a famine in vegetables and fruit. It is a serious drawback to holiday resorts for visitors to be denied ordinary fare when they have to pay dearly for what they expect to have placed before them. Although the last season was excessively wet, I have seen excellent vegetables locally grown, but the quantity was so small that the main supply has to come from long distances, and then they are not nearly so nice as those straight from local gardens. No doubt the shortage last summer was due to the land being too wet to plant. We know that the land and climate are ideal for summer vegetables in many parts around our district, but experienced labor is hard to get. We have streams and springs of good water which, without trouble, could be used profitably in producing vegetables of first-class quality, and I hope to see an increased production next season. In bringing this matter forward I do not wish to cast any reflection on our gardeners, as they are a most industrious body of men, and I am sure that if they can obtain sufficient help they will not give the customers any cause to complain. I have seen vegetables grown by Chinese on the pigface sand rises near Port Pirie, where ordinary men would scoff at the idea of trying to grow such things, and therefore I say there is much need of capable men to produce good crops, and it would be well to have men trained to this branch of industry as well as fruit, poultry, dairying, &c. Vegetable-growing is a most healthy and interesting occupation, and does not require much capital to start on, and as we all know vegetable-growing is generally coupled with fruit-growing, and good livings can be made in that way. It is a very independent life unless

hired labor is required ; but it is like farming, pays best when the labor is done by the family, who work when most needed long hours, and then when opportunities allow have a holiday."

Willunga, June 3.

(Average annual rainfall, 25½.)

PRESENT.—Messrs. Pengilly (chair), Binney, Bigg, Waye, and Hughes (Hon. Sec.).

NOXIOUS WEEDS.—Circular from Advisory Board was discussed. Members strongly condemned the district councils for neglecting to enforce the law, the condition of many of the roads being a disgrace. Members thought that the non-enforcement of the law was in many cases due to some of the councillors being the worst offenders in the matter of allowing weeds to grow on the roads adjoining their properties. Members favored the establishment by the Government of a board with power to carry out the Noxious Weeds Act throughout the State. This subject was suggested for discussion at Congress.

PHALARIS COMMUTATA.—Mr. Pengilly tabled samples of this grass, last season's growth, nearly 6ft. high. This year's growth was already 18in. high. The plants were growing in a rather dry position and received no artificial watering.

Woodside, June 14.

(Average annual rainfall, 31in.)

PRESENT.—Messrs. C. W. Fowler (chair), E. Knuckey, F. Baldock, G. Johnston, J. Drummond, G. J. Sampson, J. Lauterbach, R. W. Kleinschmidt, J. W. Disher, A. Disher, A. D. Johnston, H. Rollbusch, R. P. Keddle, J. Keen, W. Morcom, A. S. Hughes (Hon. Sec.).

VEGETABLE-GROWING: WHAT AND WHEN TO PLANT.—Mr. J. Keen suggested the following calendar of operations in the garden for this district:—*January and February*—Sow Up-to-Date potatoes, small seed, not cut; Canadian Wonder beans (dwarf); Butter beans (runner); plant out cabbage and cauliflower plants and summer lettuce; sow turnips, parsnips, carrots; plant celery plants, large variety swedes. *March*—Plant a bed of Zebra beans (runners), swede turnips; about end of March sow a seed bed of spring cabbages and cauliflowers. *April*—In very early position sow a bed of early dwarf peas about end of month; sow onion seed, if locality suitable, early in month. *May*—Carrots, parsnips, Yorkshire Hero peas; at end of month plant out spring cabbage. *June*—Yorkshire Hero peas, carrots, parsnips; plant out spring cabbages and cauliflowers, if protected from frost sow Bismarck potatoes. *July*—Potatoes, Pink Eye or Bismarck, either stable manure or a mixture of 2cwt. bone super., ½cwt. sulphate of ammonia, ½cwt. sulphate of potash; peas, Yorkshire Hero, sow in drills 2ft. apart with little bonedust; carrots, in drills, 9in. or 10in. apart, with little bonedust or bone super.; parsnips, Hollow Crown, same as carrots; onions. *August*—Potatoes, Pink Eye, Prolific, or Up-to-Date; peas, turnips, non-seeding or Red Ring lettuce leaf, same as carrots; sow seed bed of intermediate cabbage seed and lettuce, beet, turnips, sow in drills same as carrots; onions. *September*—Peas, improved Yorkshire Hero; turnips, Red Rings or Purple Tops; potatoes, Up-to-Date; beet, Egyptian; beans, improved Emperor William; transplant cabbage and lettuce. *October*—Sow seed bed of cabbage and lettuce; beans, dwarf, Case Knife or Emperor William; Butter (runner); turnips and beetroot. Plant dwarf beans in rows 2ft. apart, 4in. to 6in. in the row; use cow manure when possible, Hoe in a little bone super. It is a good plan in planting beans, when cow manure is not obtainable, to put the bone super. in the drills with the beans and cover with stable manure. This makes it ready for beans to come through and serves as a good mulch. All beans should be mulched in the summer time. *November*—Beans, Canadian Wonder, Butter; turnips, and beet. *December*—Beans, Canadian Wonder, Butter, or Giant Case Knife. Transplant summer cabbage and lettuce at the end of the month; sow potatoes, Up-to-Date, small seed, not cut; peas, a good late sort.

SOUTH-EAST DISTRICT.

Kalangadoo, June 10.

PRESENT.—Messrs. G. Riddoch (chair), S. and D. Tucker, J. Boyce, Hemmings, Drewith, and Sudholz (Hon. Sec.), and one visitor.

NOXIOUS WEEDS.—It was decided that the several district councils in the South-East be asked to enforce the destruction of star thistles and other noxious weeds.

'EXHIBITS.—A turnip 9lbs. in weight, of the purple top variety, was tabled by Mr. D. W. Tucker; also a fine sample of potatoes, blue prolific variety, which had yielded 9 tons per acre.

FATTENING SHEEP.—Mr. Tucker read a paper on "Fattening Sheep in the Kalangadoo District" as follows:—"I take this subject for my paper, as most of our members are more or less interested in this industry. In a district such as this, where such a large number of lambs are reared annually, there is in consequence a large surplus to dispose of every year, and we should study the most profitable way of dealing with them. In my opinion in a district like this, especially on the better class of land, no breeder should sell his sheep for stores unless for breeding purposes, because if sold as stores the man who buys and fattens is in most cases the man who makes the profit. Care should be taken never to overstock. It will pay you well always to have plenty of feed, as your sheep grow much larger and faster, and when put into the fattening paddock do not take nearly so long to be ready for the market. Owners should always have a certain number of fat sheep on hand, and by proper methods of feeding this can be done. By so doing you can take advantage of a rise in the market at any time. Your farm or run should be fenced into convenient-sized paddocks, and have three paddocks for fattening purposes—one as a topping-up paddock and the others as feeders. In this district, by proper methods, sheep can be fattened all the year through, that is, especially on the better class of land. There should be enough feed brought forward from the spring to hold the condition during the month of January, with the help of your stubble lands. I would advise owners to have a field of peas, which are one of the best summer feeds for fattening that I have seen. This will carry you through February, and with the help of a little kale or rape—I prefer the kale, as it does not suffer so much during the dry weather with blight as the rape—this will take you over March; then your rye grass should be ready, which will keep you well on to the middle of June. Then you should have a paddock of rye and oats mixed with rape or vetches. The rye and oats should always be mixed, as the sheep will not be so likely to scour with the rye as they would be on oats alone. The rape helps to make up a real good fattening paddock. This should keep you on till September; then your rye grass should again be in good order, and will keep you till the spring, when feed should be good enough to fatten on anywhere. Fattening our own sheep has been one of the most profitable lines on our farm. All the fodder I have mentioned has been grown successfully by us on our farm in this district during the past 12 months."

Kingston, May 27.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. Jackson (chair), Redman, Evans, Smith, Wilson, Wight, Lloyd, and Barnett (Hon. Sec.).

TREE-PLANTING FOR WINDBREAKS.—Mr. Lloyd read the following paper on this subject:—"In many places there is such a dearth of timber that it is absolutely necessary to provide shelter for stock. Many people seem to think that the hills provide sufficient shelter. This is not so, for where the hills are bald the wind follows the surface and sweeps into the valleys with great violence, and often does more damage than in an open plain. The case is different where the hill is crowned with trees—not too thick. If too thick, the object is in part defeated, as that is only making the hill higher; whereas scattered timber will break the wind, checking the force of the lower currents. As the country to which these observations apply has usually stony hills, I would recommend sheoak and land teatree for the more exposed and rocky places. Wattles are suitable for any other part in that class of country. For the flats, where the wind is so keen, the land wet, and shelter scanty, I know of nothing to compare with salt-water teatree. The young plants are easily moved in the winter, and if planted about 3ft. apart will soon draw themselves up to a fair height. They rarely blow over, even in the stoniest ground, and are not to be despised for posts. Where a break is required for a garden, it is a good plan to first

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The following publications have been issued by the Department, and are available for distribution at prices mentioned:—

Pruning of Fruit Trees, by G. Quinn, 1s. 3d.; posted, 1s. 7d.

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Reports of Conferences of Australasian Fruitgrowers held at Brisbane and Wellington, 1s. each, or 1s. 3d. if posted.

Journal of Department of Agriculture of South Australia, 1s. per annum, in advance; 3d. per copy.

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Stock: Stomach and Bowel Disorders of the Horse; The Branding of Stock; Review of the Wool Season; Bot-fly; Worms in Horses.

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